Service Manual

HP LaserJet 4V / 4MV (C3141A / C3142A)

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WARNING

Electrical Shock Hazard

To avoid electrical shock, use only supplied power cords and connect only to properly grounded (3-hole) wall outlets.

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Conventions

This manual uses the following conventions:

Color is used to emphasize items which are important to the material under discussion.

The names of major printer parts and assemblies are Capitalized.

Bold is used for emphasis, particularly in situations where *italic* type would be confusing.

Italic type is used to indicate related documents or emphasis.

COMPUTER type indicates text as seen on a computer monitor.

Keyface indicates keys on a computer keyboard or on the printer control panel. Examples include Form Feed , Enter and On Line .

NOTE Notes contain important information set off from the text.

CAUTION Caution messages alert you to the possibility of damage to equipment or loss of data.

WARNING! Warning messages alert you to the possibility of personal injury.

Chapter Descriptions

1 Product Information

Orientation to the printer, as well as the service and repair philosophy is discussed. Information on obtaining assistance and warranty is also here.

2 Site Requirements

Here are recommendations pertaining to installation requirements.

3 Operating Overview

This chapter has detailed information about the Control Panel. Sample self tests and printer reset information are also included.

4 Maintenance

Turn to this chapter for information about printer cleaning.

5 Functional Overview

Here you will find the basic theory-of-operation information required to understand the various printer systems and how they function together.

6 Removal and Replacement

This chapter contains the step-by-step procedures for replacing printer field replaceable units (FRUs). Assemblies are grouped by location in the printer.

7 Troubleshooting

Diagnose printer problems here. Preliminary troubleshooting table is followed by error messages, image defect samples, and diagnostic tools.

8 Parts and Diagrams

Look here to find any field replaceable unit (FRU) in the printer. Exploded view drawings are accompanied by complete part number tables.

A Parts Index

All parts are sorted and cross-referenced here by part number and name.

B I/O Information

This appendix contains cabling and pin-out information for parallel and LocalTalk interfaces which are supported by the printer.

C Regulatory Information

Here are required statements regarding RFI and laser safety.

Subject Index

Use the subject index to quickly locate any information in the manual.

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Printer Features

Table 1-1 Printer Features

Features	LaserJet 4V (C3141A)	LaserJet 4MV (C3142A)
Print Speed	16 ppm letter or A4 8 ppm ledger (11x17) or A3	16 ppm letter or A4 8 ppm ledger (11x17) or A3
Text & Graphics Resolution	600 dpi; plus Resolution Enhancement technology (REt)	600 dpi; plus Resolution Enhancement technology (REt)
Printer Language(s) Standard Optional	 Enhanced PCL 5 Adobe PostScript Level 2	 Enhanced PCL 5 Adobe PostScript Level 2 None
Monthly Usage (pages)	Up to 35,000	Up to 35,000
Memory: Standard[1] Optional (maximum)[2]	 4 Mbyte 68 Mbyte total	 12 Mbyte 44 Mbyte total
Internal Typefaces	45 PCL	45 PCL, 35 PostScript
Cartridge Slots	0	0
Standard Interfaces	Bi-Tronics Parallel (IEEE 1284)	Bi-Tronics Parallel (IEEE 1284) JetDirect MIO
Power Control	Power Save Mode	Power Save Mode
Control Panel	8 Keys, 16 Character VFD Display	8 Keys, 16 Character VFD Display
EconoMode (toner saving)	Yes	Yes

[1] Printer memory is optimized with Memory Enhancement Technology (MEt).
[2] SIMMS available for use include 1, 2, 4, 8, and 16 Mbtye Modules. See “Accessories & Supplies” in Chapter 8 for option product numbers.

Paper Capacities and Sizes

Table 1-2 Paper Capacities and Sizes

Name	Product Number	Capacity	Basis Weight	Size Range
MP Tray	N/A	100 sheets	17 to 28 pounds (64 to 105 g/m2)	Maximum 11.7 x 17.7 in. (297 x 450 mm) Minimum 3.9 x 5.8 in. (100 x 148 mm) Standard sizes: A3, A4, B/Ledger, B4, B5, Letter, Legal, Executive
Paper Output Bin	N/A	250 sheets	17 to 28 pounds (64 to 105 g/m2)	N/A
Standard Cassettes				
Letter/A4	C3160A	250 Sheets	17 to 28 pounds (64 to 105 g/m2)	Selectable between letter and A4
11X17/A3	C3161A	250 Sheets	17 to 28 pounds (64 to 105 g/m2)	Selectable between ledger and A3
Optional Cassettes				
Legal	C3162A	250 Sheets	17 to 28 pounds (64 to 105 g/m2)	Legal only
B4	C3163A	250 Sheets	17 to 28 pounds (64 to 105 g/m2)	JIS B4 only
B5	C3164A	250 Sheets	17 to 28 pounds (64 to 105 g/m2)	JIS B5 only
Lower Cassette	C3760A	500 Sheets	17 to 28 pounds (64 to 105 g/m2)	Adjustable for letter, legal, ledger, A4, A3, and JIS B4

Identification

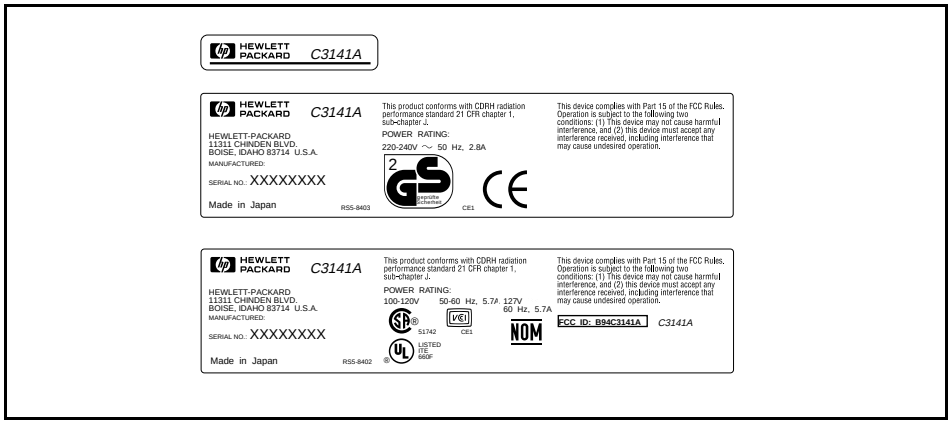
Model and Serial Numbers

The model number and serial numbers are listed on identification labels located on the rear of the printer. The model number is alphanumeric, such as C3141A for the HP LaserJet 4V printer.

The serial number contains information about the Country of Origin, the Revision Level, the Production Code, and production number of the printer.

The rear labels also contain power rating and regulatory information as shown in Figure 1-1.

Figure 1-1


HEWLETT PACKARD C3141A
HEWLETT PACKARD C3141A
HEWLETT-PACKARD
11311 CHINDEN BLVD.
BOISE, IDAHO 83714 U.S.A.
MANUFACTURED:
SERIAL NO.: XXXXXXXX
Made in Japan
RSS-8403
This product conforms with CDRH radiation performance standard 21 CFR chapter 1, sub-chapter J.
POWER RATING:
220-240V ~ 50 Hz, 2.8A
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
CE1
HEWLETT PACKARD C3141A
HEWLETT-PACKARD
11311 CHINDEN BLVD.
BOISE, IDAHO 83714 U.S.A.
MANUFACTURED:
SERIAL NO.: XXXXXXXX
Made in Japan
RSS-8402
This product conforms with CDRH radiation performance standard 21 CFR chapter 1, sub-chapter J.
POWER RATING:
100-120V 50-60 Hz, 5.7A 127V 60 Hz, 5.7A
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
FCC ID: B94C3141A
C3141A
CE1
NOM

Sample Model and Serial Number Labels

Specifications

This section contains information on physical and electrical characteristics of the printer. For information on printer site requirements (such as operating temperature and humidity, ventilation, etc.) see Chapter 2.

Table 1-3 Printer Dimensions

Description	Dimension
Width	18 in. (46 cm)
Depth	23 in. (59 cm)
Height (standard) (with Optional Lower Cassette)	12 in. (30 cm) 17.3 in. (44 cm)
Weight (with toner cartridge)	52 lbs. (23.5 kg)
Toner cartridge weight*	70.5 oz. (2000 g) full 56.4 oz. (1600 g) empty

* Some quantity of toner will reside in the waste toner area of a toner cartridge when the toner supply is exhausted. Therefore, using toner cartridge weight may be an unreliable indication of remaining toner supply.

Table 1-4 Electrical Specifications

Volts	Freq	Amps	Watts (typical)
120 Vac ± 10% 100 Vac ± 10%	50/60 Hz ± 2 Hz 50/60 Hz ± 2 Hz	12.4 @ 120v	printing = 385 standby = 115 Power Save Mode = 31
220 Vac ± 10% 240Vac ± 10%	50/60 Hz ± 2 Hz 50/60 Hz ± 2 Hz	5.4 @ 220v	printing = 400 standby = 120 Power Save Mode = 38

*Operating current requirements.

Table 1-5 Acoustic Emissions

Operation position (per ISO 9296)		
Printing	L_{PA} dB(A)	55 db
Standby	L_{PA} dB(A)	38 db
Power Save	L_{PA} dB(A)	33 db
Bystander 1m (per ISO 9296)		
Printing	L_{PA} dB(A)	51 db
Standby	L_{PA} dB(A)	34 db
Power Save	L_{PA} dB(A)	29 db
Sound Power (per ISO 9296)		
Printing	L_{WAD}	6.6 bels (A)
Standby	L_{WAD}	4.9 bels (A)
Power Save	L_{WAD}	4.4 bels (A)

Media Selection Guidelines

NOTE More detailed specifications are in the *HP LaserJet Printer Family Paper Specification Guide,* HP Part No. 5002-1801 (See "Related Documentation and Training Media" later in this chapter).

Paper

To achieve the best possible print quality and avoid paper jams, follow these guidelines for selecting paper:

- Use only copier grade paper that meets all specifications in the paper specification guide. Avoid paper with embossed lettering, perforations, or texture that is too smooth or too rough.
- Colored paper should be of the same high quality as white photocopy paper. The pigments must withstand the fusing temperature of 392° F (200° C) for 0.1 second without deterioration. Do not use paper with a colored coating that was added after the paper was produced.
- Pre-printed forms must be printed with non-flammable, heat-resistant inks that do not melt, vaporize, or release hazardous emissions when subjected to the fusing temperature of 392° F (200° C) for 0.1 second.
- A small sample of a new print media should be tested before purchasing large quantities.

Envelopes

CAUTION To prevent severe printer damage, do not use envelopes having windows, clasps, snaps, or synthetic materials.

Envelopes can be printed only from the MP Tray. Choose envelopes that are well-constructed. They should lay flat and be sharply creased. They should not be wrinkled, nicked, or otherwise damaged. Envelope adhesive must be compatible with the heat and pressure of the fusing process.

Adhesive Labels

Use the following guidelines when selecting labels:

CAUTION

This printer does not support use of labels with any exposed spaces. Previous LaserJet family printers could safely print on label stock with exposed spaces running lengthwise down the sheet.

Do not attempt to print on label sheets after any of the labels have been removed from the sheet. Damage to the printer may result.

- Labels must be arranged on the carrier sheet so that there are no exposed spaces on the sheet. Using label stock with spaces between rows or columns of labels can often result in labels peeling off during printing, causing serious jamming and possible printer damage.
- The top sheet (printing surface) must be of copier quality and provide good toner adhesion.
- The carrier sheet (backing sheet) must be compatible with the temperatures and pressure of the fusing process, and must be coated for easy release of the top sheet.
- The adhesive must be stable at the 392° F (200° C) temperatures encountered for 0.1 second in the fusing process, and must not produce emissions that exceed exposure levels or threshold limits established by OSHA and other safety agencies. Adhesives must not come into direct contact with any part of the printer.

NOTE

The MP Tray is recommended for printing adhesive labels.

A wide selection of suitable labels is available through Hewlett-Packard. A list of available sizes is located in the *HP LaserJet Printer Family Paper Specification Guide*, HP Part No. 5002-1801.

Transparencies

Overhead transparencies used in HP LaserJet printers must be able to withstand the 392° F (200° C) temperatures encountered in the printer's fusing process for 0.1 second. Suitable transparency film is available through Hewlett-Packard. Refer to the *HP LaserJet Printer Family Paper Specification Guide*, HP Part No. 5002-1801 for details.

NOTE

The MP Tray is recommended for printing transparencies.

Storing Print Media

Follow these guidelines when stacking and storing print media:

- Store paper in its ream wrapper until ready to use.
- DO NOT store cartons or reams directly on the floor where they will absorb a higher moisture content. Instead, place cartons on a pallet or on shelves.
- DO NOT store individual reams in a manner that causes them to curl or warp along the edges.
- Re-wrap partially used packages of media before storing.
- DO NOT stack more than six cartons on top of each other.
- Stack each carton upright and squarely on top of the one underneath.
- DO NOT place anything on top of media, regardless of whether the paper is packaged or unpackaged.
- Store envelopes in a protective box to avoid damaging the envelope edges.
- Keep stored media away from temperature and humidity extremes.
- DO NOT store printed documents in vinyl folders (which may contain plasticizers) or expose the documents to petroleum based solvents.

Shipping Print Media

When shipping print media through different environments, plastic wrap all cartons on the shipping pallet. When shipping media across bodies of water, wrap individual cartons as well. Packaging must protect the media from physical damage.

Product Overview

External Assembly Locations (1 of 2)

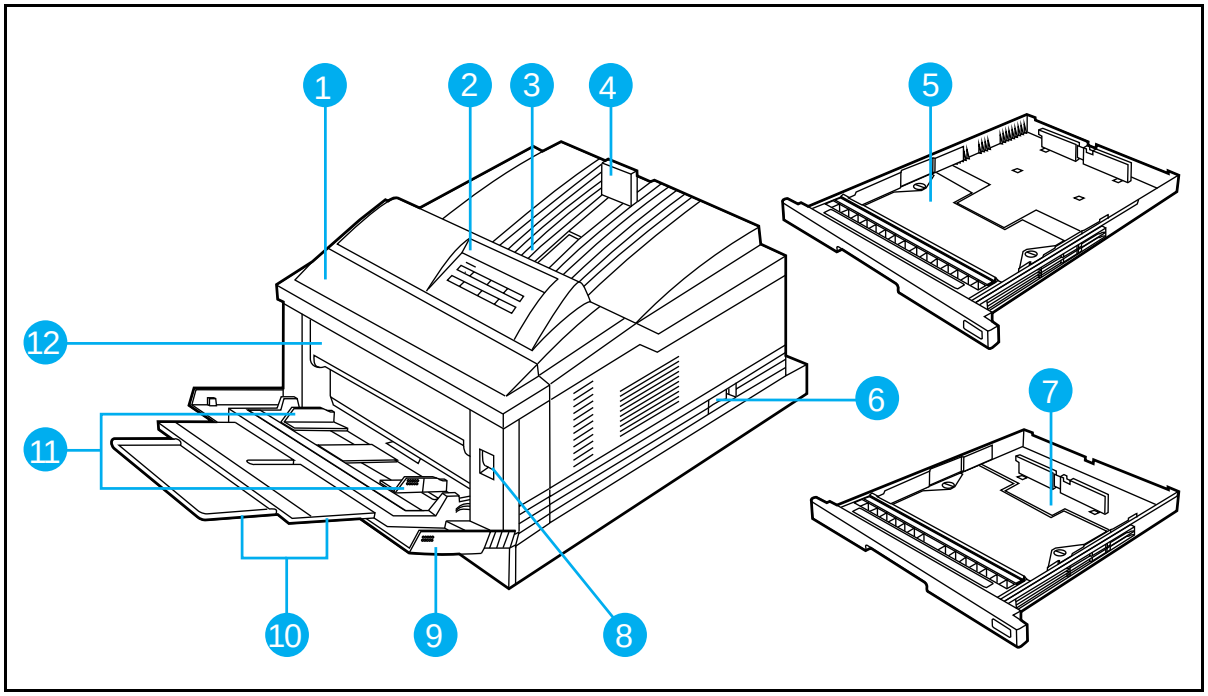


Figure 1-2 Front and Right Side View with MP Tray Open

1 Front Cover
2 Control Panel
3 Output Bin
4 Adjustable Paper Stop
5 250 sheet ledger (11x17) or A3 Paper Cassette
6 ON/OFF Switch
7 250 sheet Letter or A4 Paper Cassette
8 Front Cover Release Button
9 Multipurpose (MP) Tray
10 MP Tray Extension
11 MP Tray Paper Width Guides
12 Fuser Door

External Assembly Locations (2 of 2)

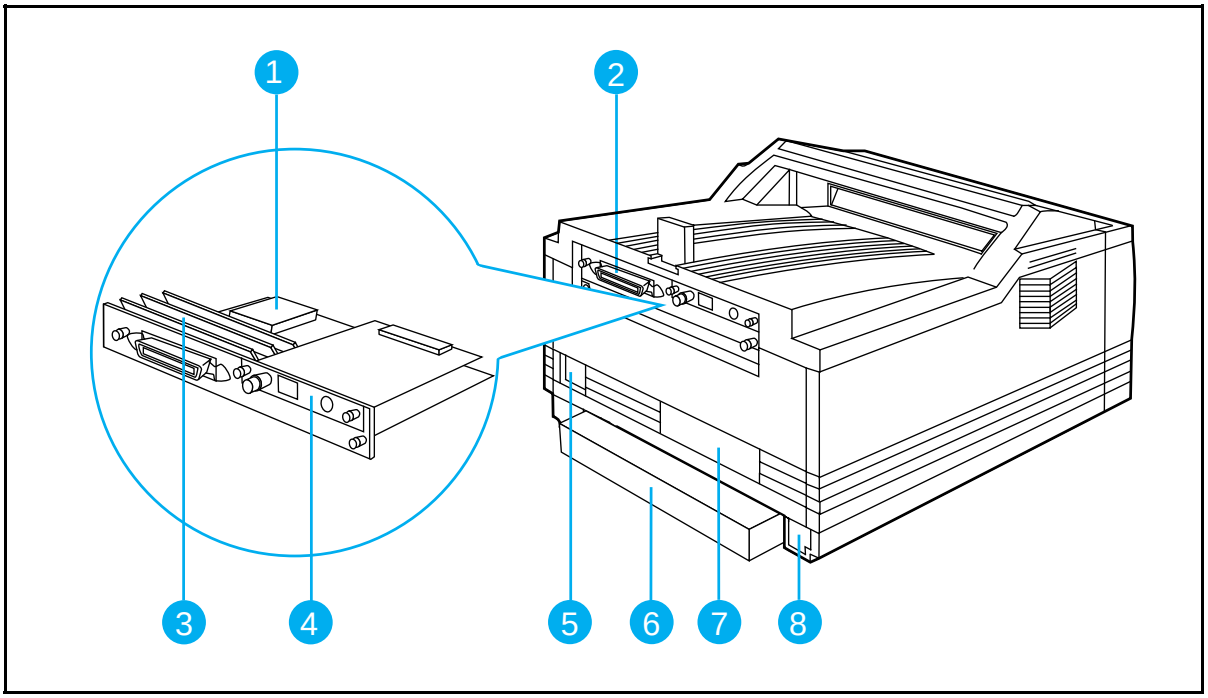


Figure 1-3 Rear and Left Side View

1 Optional 42.8 Mbyte Disk Accessory Location
2 Parallel Bi-Tronics Interface
3 SIMM Slots
4 Multiple I/O (MIO) slot
5 Power Supply Connector
6 Dust Cover for 250 sheet ledger (11x17) or A3 Paper Cassette
7 Serial Number Plate
8 Optional Universal Lower Cassette Connector Access

Front Door Assemblies

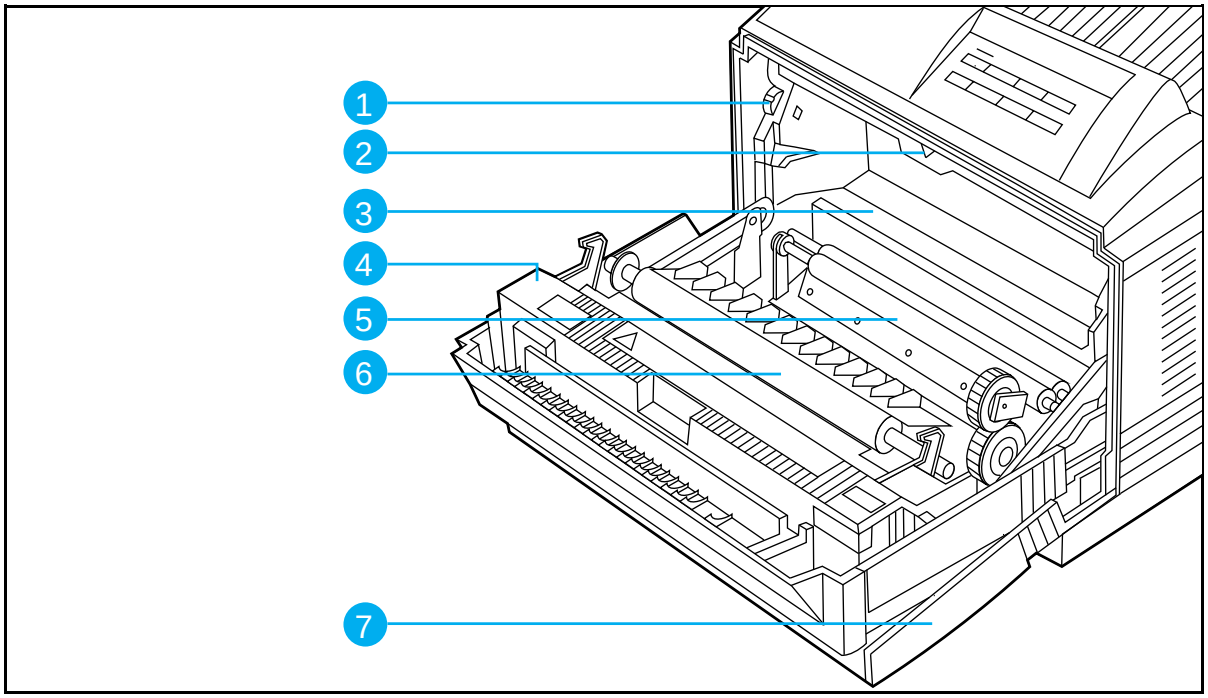
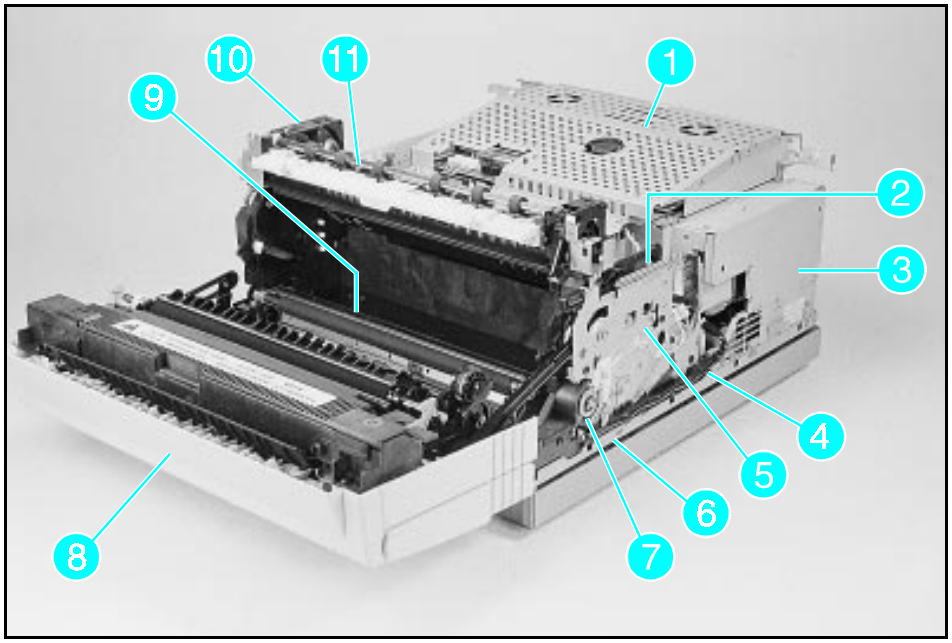


Figure 1-4 Front View with Front Cover Open (with toner cartridge removed)

1 Print Density Dial
2 Arrow guide for installing toner cartridge in printer
3 Toner cartridge cavity
4 Fusing Assembly
5 Registration Roller
6 Transfer Roller
7 Multipurpose (MP) Tray

Internal Assembly Locations (1 of 2)

Figure 1-5

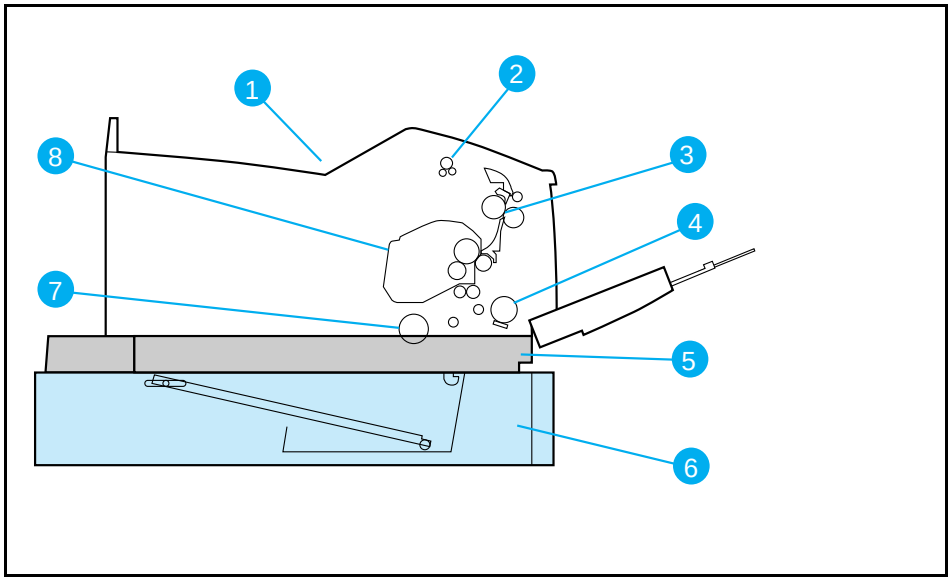


Internal Assembly Locations (1 of 2)

1 Card Cage Assembly
2 Main Motor
3 Power Supply Unit
4 Fusing Assembly Cable
5 Main Drive Assembly
6 Cassette Pickup Roller Clutch
7 Registration Roller Clutch
8 Front Door
9 Cassette Pickup Roller (under plate)
10 Exhaust Fan (FM1)
11 Delivery Assembly

Internal Assembly Locations (2 of 2)

Figure 1-6



Internal Assembly Locations (2 of 2)

1 Output Bin
2 Delivery Assembly
3 Fusing Rollers
4 Transfer Roller
5 Standard Paper Cassette
6 Optional Lower Paper Cassette
7 Cassette Pickup Roller
8 Toner Cartridge

Service Approach

Repair of the printer normally begins with use of the printer's internal diagnostics in conjunction with the troubleshooting procedures in Chapter 7. Once a faulty part is located, repair is generally accomplished by assembly level replacement of Field Replaceable Units (FRUs). Some mechanical assemblies may be repaired at the subassembly level. PCA component replacement is not supported by Hewlett-Packard.

Ordering Parts

Field replaceable part numbers are found in Chapter 8 of this manual. Replacement parts may be ordered from HP's Service Materials Organization (SMO), or Support Materials Europe (SME).

Phone numbers for the various sources are:

- SMO (Service Materials Organization)
  1-800-227-8164 (U.S. only)
- SME (Support Materials Europe)
  (49 7031) 142253
- HP's Distribution Center (HPD)
  1-303-353-7650

Exchange Program

HP offers remanufactured assemblies for some parts. These are identified in Chapter 8 and can be ordered through Parts Direct Ordering (PDO), or Support Materials Europe (SME).

Consumables

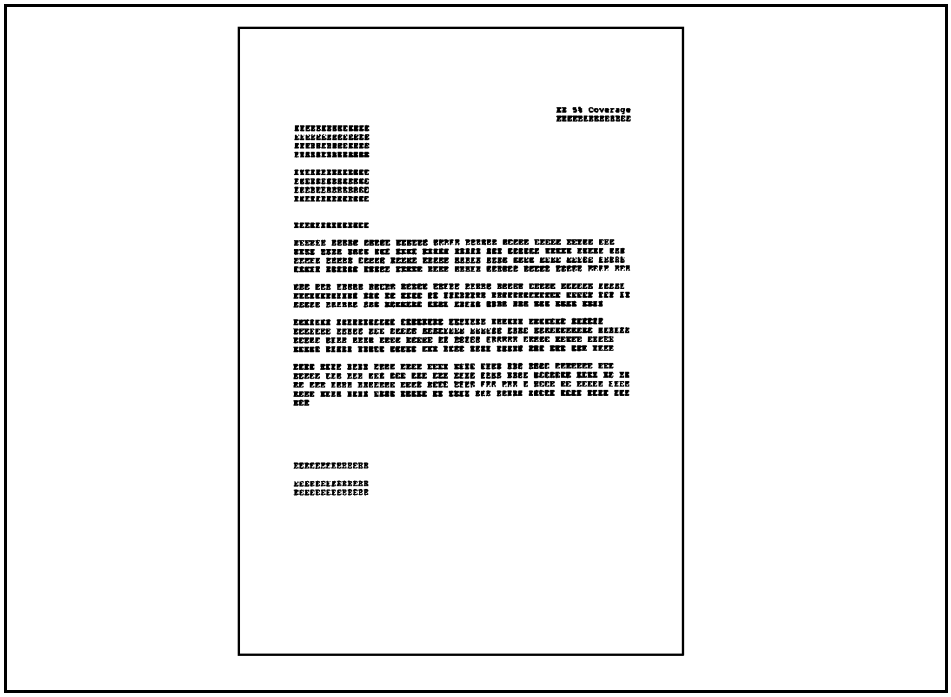
The printer has no consumables other than the toner cartridge, which may be ordered directly from Hewlett-Packard. Refer to Chapter 8 for ordering information.

Toner Cartridge Life

The toner cartridge (C3900A) is designed to simplify replacement of the major “consumable” parts. The toner cartridge contains the printing mechanism and a supply of toner.

At 5% page coverage, a toner cartridge will print approximately 7500 pages (see Figure 1-7).

Figure 1-7



Sample 5% Page Coverage

When regularly printing pages with less coverage, such as short memos, a toner cartridge should print more than 7500 pages. However, the cartridge may print less than 7500 pages if routinely printing very dense print.

NOTE

For best results, always use a toner cartridge before the expiration date stamped on the toner cartridge box.

Refilled Toner Cartridges

While Hewlett-Packard does not prohibit the use of refilled toner cartridges during the warranty period or while under a maintenance contract, their use is not recommended for the following reasons:

- Repairs resulting from the use of refilled toner cartridges are not covered under the Hewlett-Packard warranty or maintenance contract.
- Hewlett-Packard has no control or process to ensure that a refilled toner cartridge functions at the high level of reliability of a new HP LaserJet toner cartridge. Hewlett-Packard also cannot predict what the long term reliability effect on the printer is from using different toner formulations found in refilled cartridges.
- The print quality of HP LaserJet toner cartridges influences the customer's perception of the printer. Hewlett-Packard has no control over the actual print quality of a refilled toner cartridge.

Recycling Toner Cartridges

In order to reduce waste, Hewlett-Packard utilizes a recycling program for used toner cartridges. Cartridge components that do not wear out are recycled. Plastics and other materials are recycled. Hewlett-Packard pays the shipping costs from the user to the recycling plant. For each cartridge returned, HP donates one U.S. dollar to be shared by the Nature Conservancy and the National Wildlife Federation. To join this recycling effort, follow the instructions inside the toner cartridge box.

Related Documentation and Training Media

Table 1-6 lists where to order related documentation. See "Ordering Parts" earlier in this chapter.

Table 1-6 Related Documentation

Description	Part Number	SMO	SME	HPD
HP LaserJet Family Quick Reference Service Guide	5961-0531	X	X	
HP LaserJet 4V and 4MV Printers User's Manual[1]	C3141-90901	X	X	
HP PCL5 Printer Language Technical Reference Information Package	5961-0601	X	X	
HP LaserJet Printer Family Paper Specifications Guide	5002-1801			X
Introduction to Network Printing, Book	5961-0649	X	X	
Network Printing for the Enterprise, Video	5961-0650	X	X	
LaserJet Basic Hardware Training Course	5961-0880	X	X	
Solutions Connectivity Guide (Available from LDC 1-800-544-9976)	5962-8536E			
Specific Application Drivers				X

[1] Shipped with printer. (English version part number is shown. Other translations are available see your local HP Sales Office.)

Technical Assistance

HP ASAP (Automated Support Access Program) provides free technical support information 24 hours a day, 7 days a week. The ASAP system includes HP AUDIO-TIPS and HP FIRST, both explained below. The ASAP service requires a touchtone phone.

HP AUDIO-TIPS

HP AUDIO-TIPS is an interactive voice response system providing prerecorded answers to the most frequently asked questions by HP LaserJet printer users. Helpful "System Maps" to the HP AUDIO-TIPS recordings are available by fax through HP FIRST.

HP FIRST

HP FIRST (Fax Information Retrieval Support Technology) is a phone-in fax service providing technical information for HP LaserJet users as well as service personnel. Receiving a fax requires a group 3 facsimile machine or fax card. Service related information includes:

- Service notes (HP Authorized dealers)
- Application notes
- Product Data Sheets
- Material Safety Data Sheets (MSDS)
- Typeface and accessory information
- Printer support software information
- Toner information
- Driver request form and Software Matrix.

HP FIRST, U.S.

Call the HP ASAP system (1-800-333-1917) and follow the voice prompts to enter HP FIRST.

HP FIRST, Europe

Call HP FIRST at one of the following numbers:

U.K., 0800-96-02-71
Belgium (Dutch), 078-111906
Switzerland (German), 155-1527
Netherlands, 06-0222420
Germany, 0130-810061
Austria, 0660-8128

For English service outside the above countries, (31) 20-681-5792.

HP CompuServe Forum

CompuServe members can download a variety of support materials including product data sheets, software application notes, and printer drivers for many popular software applications. Members may also post and reply to questions in an interactive format. To access the HP Forum, type GO HP at any prompt. For more information, or to join CompuServe, call 1-800-524-3388.

North American Response Center (NARC)

The North American Response Center (NARC) is available for technical support to assist service technicians. The NARC can be reached at 1-800-544-9976 between 7:00 A.M. and 6:00 P.M. Mountain Standard Time, Monday, Tuesday, Thursday and Friday. On Wednesdays the office closes at 4:00 P.M.

Other Areas

Outside of North America and Europe, contact your local HP sales office for assistance in obtaining technical support.

Warranty Statement

Warranty

This warranty gives specific legal rights. There may also be other rights which vary from area to area. Refer to Appendix E in the User's Manual for further warranty information.

One Year Return to HP Authorized Repair Station

Hewlett-Packard warrants the LaserJet 4V/4MV printer against defects in materials and workmanship for a period of one year from receipt by the customer. During the warranty period, HP will, at its option, either repair or replace products which prove to be defective.

NOTE

User maintenance components are not covered under the HP LaserJet 4V/4MV printer factory warranty. A separate maintenance agreement may be written to cover these components.

Exclusions

The warranty on printers shall not apply to defects resulting from:

- Improper or inadequate maintenance by customer.
- Customer supplied software or interfacing.
- Unauthorized modification or misuse.
- Operation outside of the environmental specifications for the product.
- Operation of non-supported printing media.
- Duty cycle abuse maximum (printing more than the equivalent of 35,000 single-sided pages per month).
- Operating the printer from a mechanical switchbox without a designated surge protector.
- Improper site preparation and maintenance.
- Use of non-HP toner cartridges (see the following explanation), SIMM memory boards, or interface boards.

The use of non-Hewlett-Packard toner cartridges does not affect either the warranty or any maintenance contract purchased from HP. However, if an HP LaserJet printer failure or if printer damage is found to be directly attributable to the use of any non-HP product, the repair will not be covered under the warranty or HP maintenance contract. Hewlett-Packard cannot recommend use of non-HP cartridges, either new or remanufactured, because they are not HP products and HP cannot influence or control their quality.

2

Site Requirements

Chapter Contents

Operating Environment 2-3
Space Requirements 2-4
Environmental Requirements 2-4

Operating Environment

The environmental specifications (listed in the “Specifications” section of Chapter 1) must be maintained to ensure the proper operation of this printer. Consider the following points before installing the printer:

- Install in a well-ventilated, dust-free area.
- Install on a hard, flat and continuous surface, with all four printer feet level. Do not install on carpet or other soft surfaces.
- Ensure adequate power is supplied. Printer power requirements are listed under “Specifications,” in Chapter 1.
- Install where there is stable temperature and humidity, away from water sources, humidifiers, air conditioners, refrigerators, or other major appliances.
- Install away from direct sunlight, open flames, or ammonia fumes. If the printer is placed near a window, make sure the window has a curtain or blind to block any direct sunlight.
- Install with enough space around the printer for proper access and ventilation (see Figure 2-1).
- Install printer away from the direct flow of exhaust from air ventilation systems.

Space Requirements

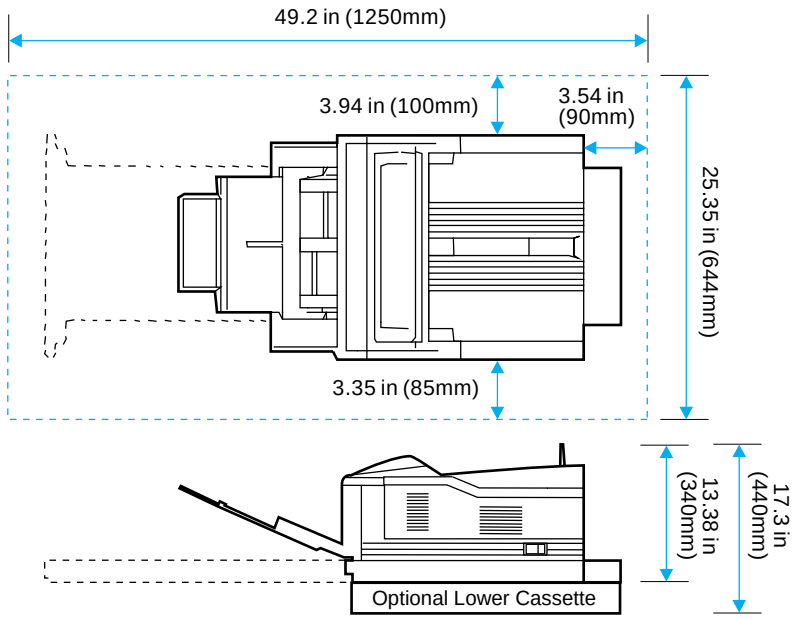


Figure 2-1 Printer Space Requirements

Environmental Requirements

Keep the printer within the following environmental conditions for optimum performance.

Table 2-1 Printer and Toner Cartridge Environmental Conditions

Item	Operating	Storage
Temperature	10° to 32.5° C (50° to 90.5° F)	0° to 40° C (32° to 105° F)
Humidity	20 to 80% RH (with no condensation)	10 to 95% RH (with no condensation)

3

Operating Overview

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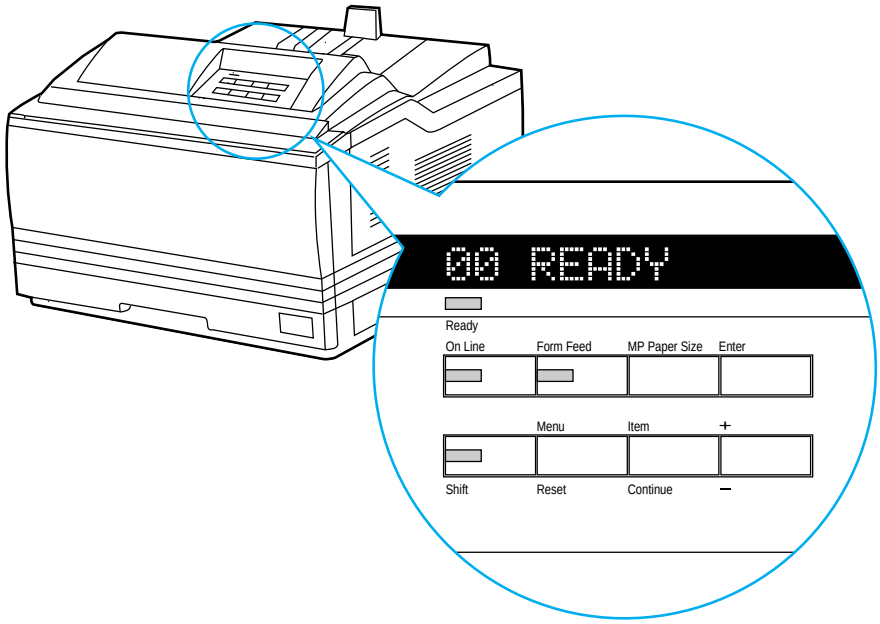
Using the Control Panel

Control Panel Layout

The control panel consists of a 16-character display panel, three indicator lights, and eight keys, three of which have alternate functions.

Figure 3-1



Control Panel Layout

Indicator Lights

The control panel indicator lights are described in the following table. The column labeled "Do this:" includes an action only when an action is required.

Table 3-1 Indicator Lights

When this indicator:	Looks like this:	It means this:	Do this:
Ready	On	Ready to print.	
	Flashing	Print job in progress.	Let job finish printing.
	Off	Not ready to print.	See display panel message.
On Line	On	Ready to receive data.	
	Flashing	Going off line.	
	Off	Printer is off line.	Access other keys or press **On Line** to place printer back on line.
Form Feed	On	Data still in print buffer.	Take printer off line; press **Form Feed**; press **On Line** to place printer back on line.
	Flashing	Buffered data is printing.	
	Off	No buffered data in printer.	

Control Panel Keys

You must take the printer off line to use control panel keys, except for the MP Paper Size and keys related to its operation.

Each key in the top row has a single function. Three keys in the bottom row have more than one function. The primary function name of each key appears above the key. The alternate function name of each key appears below the key. These alternate function names are color-coded to match the **Shift** key, which you must hold down while selecting an alternate function.

You can rapidly scroll through some selections by holding down the **+/-** key.

Table 3-2 Control Panel Keys

Key	Explanation
On Line	Switches the state of communication between computer and printer either on (on line) or off (off line). For the printer to receive data, both the On Line and Ready indicator lights must be lit.
Form Feed	Prints any data remaining in the page buffer. Does not send a blank sheet of paper through the printer.
MP Paper Size	Only active when MP Tray is set to cassette (select `MP TRAY=CASS` in the Configuration Menu). Selects size of paper loaded in MP Tray. Pressing **Enter** saves your selection.
Enter	Saves a selected control panel key setting. An asterisk (*) appears next to the saved selection, indicating that it is now the default. Default settings remain in place when the printer is reset or switched OFF.
Shift	Accesses color coded alternate functions of bottom-row control panel keys. Hold down while pressing an associated key.
Menu	Cycles through menus, returning to `00 OFFLINE` at the end of the cycle unless a problem is encountered. When an option is added to the printer (PostScript, for example), a menu for that option appears in the sequence (see “Control Panel Menus” in this chapter).
Reset **Shift** + **Reset**	Resets the printer (displays `07 RESET`). Clears the page and active I/O buffers and makes the current control panel values the defaults (see “Menu of Resets” at the end of this chapter).
Item	Cycles through the selected menu items. Menu items vary depending on options installed and configuration of other menu choices.
Continue **Shift** + **Continue**	Allows the printer to resume printing after a printer message (such as `20 MEM OVERFLOW`) has placed it off line. Clears most printer messages (such as manual feed requests) and places the printer back on line.
+ or **-**	Press **+** to step through menu items. Hold down **+** to scroll through items. Press or hold down **Shift** + **-** to move through items in reverse order.

Settings and Defaults

The printer makes most printing decisions based on either temporary settings or permanent defaults.

NOTE Settings you send from software applications override printer defaults.

Table 3-3 Settings and Defaults

Setting or Default	Explanation
Temporary setting	A value set for the current print job by your software application. For example, a request from your software to print three copies instead of the control panel default value of one copy is a temporary setting. The printer continues to use the temporary setting until you send another software request or reset the printer.
Control panel default	A value you set at the control panel by selecting a menu item, then pressing **Enter**. An asterisk appears following the item name to indicate that it is now the default. The printer retains this default when it is switched off.
Factory default	The value set for each menu item at the factory. Factory defaults are marked with an asterisk in the menu tables on the pages that follow.

Setting the Display Language

1. Press and hold **Enter** while powering on. Hold **Enter** until `CONFIG LANGUAGE` appears.
2. Release **Enter**. `05 SELF TEST` appears briefly. Wait for `LANG=ENGLISH` to appear.
3. Click **+** repeatedly until the desired language appears.
4. Click **Enter** to save your choice. An asterisk (*) will appear beside your language selection.

Control Panel Menus

Pressing **Menu** gives you access to the menus, one after another. Each menu is described in a separate table in this section. When options (such as the PostScript language) are installed in the printer, new menus or menu items automatically are added in the appropriate menus.

Table 3-4 Control Panel Menu Map

PRINTING MENU	PCL MENU	PS MENU	JOB MENU	CONFIG MENU	MEM CONFIG MENU*	PARALLEL MENU	TEST MENU
COPIES	FONT SOURCE	PRT PS ERRS	RESOLUTION	MP TRAY	IO BUFFER	HIGH SPEED	SELF TEST
PAPER	FONT NUMBER	JAM RECOVER	PERSONALITY	LOCK**	IO SIZE	ADV FNCTNS	CONT SELF TEST
ORIENTATION	PITCH or PT SIZE		PWR SAVE	CLR WARN	RESRCSAVE		PCL TYPEFACE LIST
FORM	SYM SET		IO TIMEOUT	AUTO CONT	PCL MEM		PCL DEMO PAGE
MANUAL FEED				LOW TONER	PS MEM		PS CONFIG PAGE
RET							PS TYPEFACE LIST
ECONOMODE							PS DEMO PAGE
You can change these menu items either from a software application or from the control panel.				You can change these menu items only from the control panel.			
Shaded items appear when the PostScript option is installed.							

Additional menu items may appear if options are installed (such as MIO cards).
* These items will appear if sufficient memory is available.
** The Lock function is only available if MP Tray = Cassette.

To select a menu item:

1. Press **On Line** to take the printer off line.
2. Press **Menu** repeatedly until the menu you want appears.
3. Press **Item** repeatedly until the item you want appears.
4. Press **+** repeatedly (or hold down **+** to scroll) until the setting you want appears.
5. Press **Enter** to save your selection. An asterisk appears next to your selection, indicating that it is now the default.
6. Press **On Line** to place the printer back on line.

Printing Menu

You can override or change any Printing Menu setting through most software applications. When you change a setting from the printer control panel, the new setting becomes the printer default value.

Table 3-5 Printing Menu Items

Item	Options	Explanation
COPIES	1* to 999	Select any number from 1 to 999.
PAPER	LETTER**, LEGAL, A4***, EXEC, 11x17, A3, JIS B4, JIS B5, CUSTOM, COM10, MONARCH, C5, DL, B5, JPOST, JPOSTD	Sets default image size at which printer formats page unless a software setting overrides it.
ORIENTATION	P*, L	P means portrait
FORM	5 to 128 LINES (60** and 64***)	Sets vertical spacing, from 5 to 128 lines, for default paper size. Scrolls in increments of 1 line.
MANUAL FEED	OFF*, ON	Available only through MP Tray. When Manual Feed is on and the MP Tray is empty, the printer goes off line when it receives a print job and displays MF FEED *paper size* or ME FEED *envelope size*. When you place a sheet in the MP Tray, the printer goes back on line and prints the sheet.
RET	OFF, LIGHT, MEDIUM*, DARK	Refines print quality by smoothing the fine gradations along the angles and curves of the printed image.
ECONOMODE	OFF*, ON	EconoMode substantially reduces the amount of toner on the printed page; the result is similar to draft mode on some dot matrix printers.

*Factory default. **Factory default for 110V printers. ***Factory default for 220V printers.

PCL Menu

PCL Menu items allow you to choose the printer default font and symbol set. Printer Control Language (PCL) is HP printer language. You can also change such PCL Menu items as the FONT SOURCE through your software application.

Table 3-6 PCL Menu Items

Item	Options	Explanation
FONT SOURCE	I* S Mn	Internal fonts* Permanent soft fonts SIMM Module: n=slot number. Typefaces stored in one of the four ROM SIMM slots (M1=slot 1, for example).
FONT NUMBER	0 to 999	The printer assigns a number to each typeface and lists them on the PCL Typeface List, accessed under the Test Menu (see Table 3-4). The font number appears in the Font # column of the printout. You must select a FONT SOURCE in order for FONT NUMBER to appear. Defaults and other conditions are as follows: I* 0* is the default. S 1* is the default. You can select from the control panel only a permanent soft font that is currently in the printer. Mn SIMM Module; n=SIMM slot (1-4). Typefaces stored in one of the four ROM SIMM slots (M1=slot 1, for example).
PITCH or PT. SIZE	Range Pitch: 10.00* Point: 12.00*	The pitch or point size item available depends on the FONT SOURCE and FONT NUMBER you select. Pitch: For fixed-pitch outline typefaces, select pitch sizes from .44 to 99.99. Point: For proportionally-spaced outline typefaces, select point sizes from 4.00 to 999.75 in .25-point increments.
SYM SET	ROMAN-8* Many others	A symbol set is a unique grouping of all the characters in a font. PC-8 or PC-850 is recommended for line draw characters. Symbol set charts appear in the *PCL 5 Technical Reference Manual*.

*Factory default.

Job Menu

The items available in the Job Menu can also be changed through software applications if an appropriate printer driver is installed.

Table 3-7 Job Menu Items

Item	Options	Explanation
RESOLUTION	300 or 600*	For most purposes, 600 dpi is recommended.
PERSONALTY	AUTO* PCL PS	*Personality* means printer language. The printer can switch from its standard personality, PCL, to other personalities, such as PostScript. When PERSONALTY is set to AUTO, the printer analyzes each print job it receives and switches personalities automatically. When you make another personality the default, the printer stops switching personalities automatically unless a software command specifically instructs it to do so. If the PostScript option is not installed, PERSONALTY will not display in the Job Menu. If you select PS as the default, you may want to set ADV FNCTNS in the Parallel Menu to OFF.
PWRSAVE	OFF, 15 MIN, 30 MIN*, 1 HR, 2 HRS, 3 HRS	Sets the amount of time the printer is idle before the fuser shuts down. The printer automatically starts warming the fuser when you send a print job to the printer, press a control panel key, load or remove paper, or open the top door. NOTE: A ten second interval is also available in Service Mode (see “Service Mode” later in this chapter).
IO TIMEOUT	5 to 300 15*	I/O timeout refers to the time, measured in seconds, that the printer waits before ending an incomplete print job (it scrolls in increments of 10). This setting allows you to adjust timeout for best performance. If data from other ports appears in the middle of the print job, increase the timeout value.
PAGEPROTCT	AUTO* ON	You will not see this item unless the error 21 PRINT OVERRUN has occurred. (See Chapter 7 for error message troubleshooting.)

*Factory default.

Configuration Menu

Configuration Menu items cannot be changed from software applications.

Table 3-8 Configuration Menu Items

Item	Options	Explanation
MP TRAY	FIRST*	Draws paper from the MP Tray regardless of paper size (this setting not recommended for shared environments).
	CASS	The MP Tray operates as a paper cassette. Paper feeds automatically. Paper size must be selected with the **MP Paper Size** key because the MP Tray cannot sense the size of the paper. The **MP Paper Size** key works only when the MP Tray is set to `CASS`.
	MANUAL	Operates only as a manual feed tray.
LOCK	NONE* MP PC LC and combinations	Locks out a tray or a combination of trays so the printer will not draw paper. Lock-out options depend on how the MP Tray is configured and whether an optional 500-sheet Lower Cassette (LC) is installed. When the MP Tray = `MANUAL` or `FIRST` or no optional Lower Cassette is installed, no paper sources are available to be locked out. All possible options are: NONE No trays or cassettes locked out. MP The MP Tray is locked out. PC The Paper Cassette is locked out. LC The optional Lower Cassette is locked out. PC MP Only the optional Lower Cassette is available. LC MP Only the Paper Cassette is available. LC PC Only the MP Tray is available.
CLR WARN	ON*	Clearable warnings are displayed until acknowledged by pressing **Continue**.
	JOB	Clearable warnings are displayed from the time they are detected until the start of the next job.
AUTO CONT	ON*	When an error message is displayed, printer goes offline for ten seconds, then returns to on-line state.
	OFF	When an error message is displayed, printer goes offline and remains offline until operator presses **Continue**.
LOW TONER	CONT*	Printer remains on-line and continues to print on encountering a `16 TONER LOW` message.
	STOP	Printer stops and goes offline until operator changes the toner cartridge, presses **On Line**, or **Continue**.

*Factory default.

Memory Configuration Menu

This menu contains the items for personality Resource Saving and I/O Buffering. Depending on how the printer memory is configured, any combination of menu items and possible values can appear. When you change an item in this menu, the printer automatically resets, and all fonts, macros and downloaded data in the printer are lost (except data stored on the optional Disk Accessory). Memory Configuration Menu items can be selected only from the printer control panel.

Table 3-9 Memory Configuration Items

Item	Options	Explanation
IO BUFFER	AUTO* OFF** ON	The I/O buffer is a portion of the printer memory set aside to hold incoming data. When this item is set to AUTO, the memory set aside for I/O buffering is automatically determined by the printer based on available memory. When it is set to ON, the size can be manually adjusted. When it is set to OFF, no memory is set aside.
IO SIZE	10K and up	When IO BUFFER is set to ON, I/O SIZE appears in the menu. Use this item to add or reduce I/O buffer memory in increments of 10 KBytes up to 100 KBytes, then in 100 KByte increments.
RESRCSAVE	AUTO* OFF** ON	This item appears when a certain amount of memory and a personality SIMM are installed in the printer. If it is set to AUTO, the printer automatically determines the amount of memory to allocate to installed personalities (languages). When it is set to ON, additional memory management item selections appear for each installed personality (see next item). When it is set to OFF, no memory is allocated and personality-dependent resources (such as fonts) are lost when personality changes.
PCL MEM PS MEM	0 KBytes and up	When Resource Saving is set to ON, each installed personality (for example, PCL and PostScript) is added as a menu item. You can increase memory in increments of 100 KBytes up to the maximum.

*Factory default.

**The HP LaserJet 4MV printer is set to OFF at the factory.

Parallel Menu

Parallel Menu items can be selected only from the printer control panel. You cannot change or override them from your software application.

Table 3-10 Parallel Menu Items

Item	Options	Explanation
HIGH SPEED	YES* NO	The speed at which data is transmitted to the printer. YES sets the Bi-Tronics parallel interface to run at a higher data rate supported by newer computers. NO sets the Bi-Tronics parallel interface to run at a slower speed compatible with older computers.
ADV FNCTNS	ON* OFF	Choosing ADV FNCTNS=ON enables bi-directional parallel communication, which allows the printer to send status readback messages to the computer. Setting advance functions to ON may slow personality switching.

*Factory default.

Test Menu

Test Menu items can be selected only from the printer control panel. You cannot change or override them from your software application. See "Testing the Printer" later in this chapter for detailed information about running printer tests and interpreting their results.

Table 3-11 Test Menu Items

Item	Explanation
SELF TEST	When `SELF TEST` is displayed, and you press **Enter**, the printer runs a self test during which it displays the message `05 SELF TEST` and all control panel lights are lit. During the printing portion of the self test, the message `06 PRINTING TEST` is displayed.
CONT SELF TEST (Continuous Self Test)	Prints continuous self-test pages until you press **On Line** or **Shift** + **Continue**. Then the `04` portion of the display blinks and several more pages print until the buffer clears. Press **On Line** when pages stop printing.
PCL TYPE LIST PS TYPE LIST	Prints a list of the typefaces and bitmapped fonts currently available in the printer (both internal and accessory) for PCL or Adobe PostScript print jobs.
PCL DEMO PAGE PS DEMO PAGE	Prints a page that illustrates printer features (PCL or Adobe PostScript).
PS CONFIG PAGE	Prints PostScript-specific information, including current settings, printable area, and memory configuration.

Service Mode

The Service Mode should be used only by authorized service personnel. While in Service Mode, you can:

- Print a Service Mode Self Test.
- Verify and set the Page Count and serial number. These are displayed on the standard self test.
- Set the Cold Reset Default. (This sets the factory default paper size to either Letter or A4).
- Set the Demo Page=True/False. Used to remove the Demo Page option from the self test menu.
- Set the Diagnostic Functions ON or OFF (for software developers use only). The following procedure is used to initiate the Service Mode (refer to Figure 3-2).

1 Hold down the **On Line**, **Form Feed**, and **Enter** keys while powering ON the printer, until all lights are illuminated and the Display Window is blank. (If the Display Window reads `05 SELF TEST` at this point, the keys were released too soon. Repeat this step until successful.)

2 Press the **Form Feed** key, then the **Enter** key. The message `SERVICE MODE` is displayed briefly, then the printer automatically begins a `05 SELF TEST`. After several seconds, both Control Panel Indicators turn OFF. (The printer may display `02 WARMING UP` if it has not warmed up completely.) After the printer has warmed up and passed the self test, `SERVICE MODE` is displayed. To exit the Service Mode press the **On Line** key.

Power Save

An additional 10 second time interval is added to the Power Save function in Service Mode.

With Service Mode displayed, press MENU until Job Menu is displayed.

1 Press **Item** until `PWRSAVE=` is displayed.
2 Press **+/-** until the desired time interval is displayed.
3 Press **Enter** to save your selection.
4 Press **On Line** once to return to the Service Mode. Press **On Line** again to place the printer back on-line.

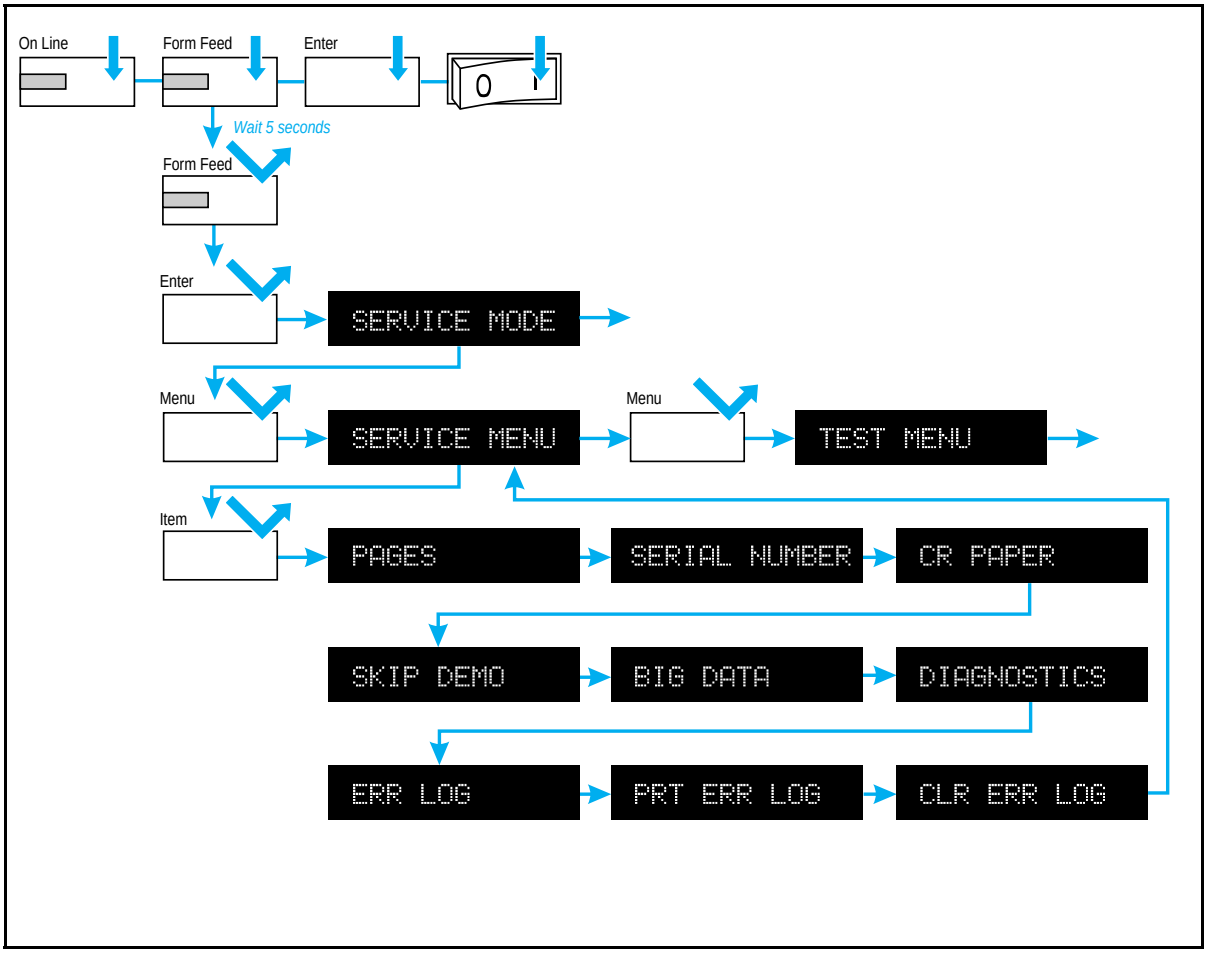


Figure 3-2 Service Mode Menus

Setting the Page Count and Serial Number

The page count and serial numbers are stored in Non-Volatile Memory. If it is necessary to replace the Formatter PCA, the page count should be set to the current value to reflect the age of the print engine. The procedure for setting the serial number is similar to setting the page count. Use the following procedure to set the page count:

Before removing the old Formatter PCA, print a control panel self test to verify the current page count and serial number of the printer, if possible.

NOTE

If it is not possible to print a self test, try to verify the values before replacing the Formatter PCA by following steps 3 through 5, below.

After verifying the page count from the old Formatter PCA, replace it with the new PCA as described in Chapter 6.

1. Enter the Service Mode as previously described in this chapter.
2. When SERVICE MODE is displayed, press **Menu** to access the Service Menu.
3. Press **Item** to step through the menu. PAGES=x00000 is displayed. (x00000 represents the page count currently stored in Non-Volatile Memory. The underlined character denotes the cursor position.)
4. Press **Enter** to scroll the cursor to underline the desired digit.
5. Press **+/-** to select the correct value.
6. Press **Enter** to store the new value in NVRAM.
7. Set each digit in the same manner. Press **On Line** to return the display to SERVICE MODE. Use the procedure described above to set the serial number in the printer memory.
8. Press **On Line** a second time to exit Service Mode.

Setting the Cold Reset Default Paper Size

When replacing a Formatter PCA with a default paper size setting of A4, set the Customization Variable to A4.

To set the Customization Variable:

1. Enter the Service Mode as previously described in this chapter.
2. Press **Menu** to access the Service Menu.
3. Press **Item** to step through the menu until `CR PAPER=LETTER*` is displayed.
4. Press **+/-** to toggle between Letter and A4 paper.
5. Press **Enter** to save your selection.
6. Press **On Line** to return the display to `SERVICE MODE`.
7. Press **On Line** a second time to exit Service Mode.

Other Service Mode Items

If any of the following items need to be changed from their default settings, the procedure is similar to that used for setting the page count or cold reset default, described above.

Table 3-12 Other Service Menu Items

Item	Default	Description
SKIP DEMO	FALSE	Inhibits printing of PCL Demo Page when set to TRUE
BIG DATA	OFF	For factory test purposes. Do not change.
DIAGNOSTICS	OFF	For factory test purposes. Do not change.
ERR LOG	N/A	Contains a list of the ten most recent errors with the related page count.
PRT ERR LOG	N/A	Prints the error log.
CLR ERR LOG	N/A	Clears the error log buffer.

Testing the Printer

When you run a self test, the printer checks its internal controller and I/O interface, then prints a test page. You can review the self test printout to verify proper installation of such options as paper cassettes or personalities.

Printing a Self Test Page

1. Press **On Line** to take the printer off line.
2. Press **Menu** until TEST MENU appears.
3. Press **Item** until the test you want to print appears.
4. Press **Enter** to print the test.
5. Press **On Line** to place the printer back on line.

NOTE

When you select CONT SELF TEST, the printer prints self test pages continuously until you press **Shift** + **Continue** or **On Line**.

Understanding the Self Test Printout

Figure 3-3 is a sample self test printout (run from Service Mode). Numbers in the sample printout match numbers in the key to the printout below. The appearance of the self test printout varies depending on the options currently installed in the printer.

Self Test Printout Key

1 Menu selections: Lists selections in the order in which they appear in the control panel display. Also includes options such as PostScript and Modular I/Os.

2 MIO information: Reserved for MIO and network statistics. For some installed MIO options, this block of information can be as long as 20 lines and three columns.

3 Serial Number and Formatter Number: Shows version number of internal code

4 RAM size: Shows total installed printer memory.

5 Page Count: Shows the number of pages the printer has printed.

6 Firmware Datecode: Eight-digit date (YYYYMMDD) and version number of formatter firmware.

7 Control Panel options status: Shows status of control panel Lock and Password functions.

8 Other installed options: Lists optional paper cassettes, personalities, and other installed options.

9 Disk Accessory: Appears when the option is installed and displays access status.

10 I/O Buffering and Resource Saving: Information about the current configuration appears here. If the printer does not have enough memory installed to enable I/O Buffering or Resource Saving, the amount of additional memory needed appears here.

11 Print Pattern: Illustrates print density and quality.

12 Resolution Enhancement: When print resolution is set to 600 dpi, the REt block appears here. The REt block illustrates current print resolution enhancement.

13 PCL Memory Information: Shows the total amount of installed memory, and also indicates the amount available for PCL applications (such as font downloading software).

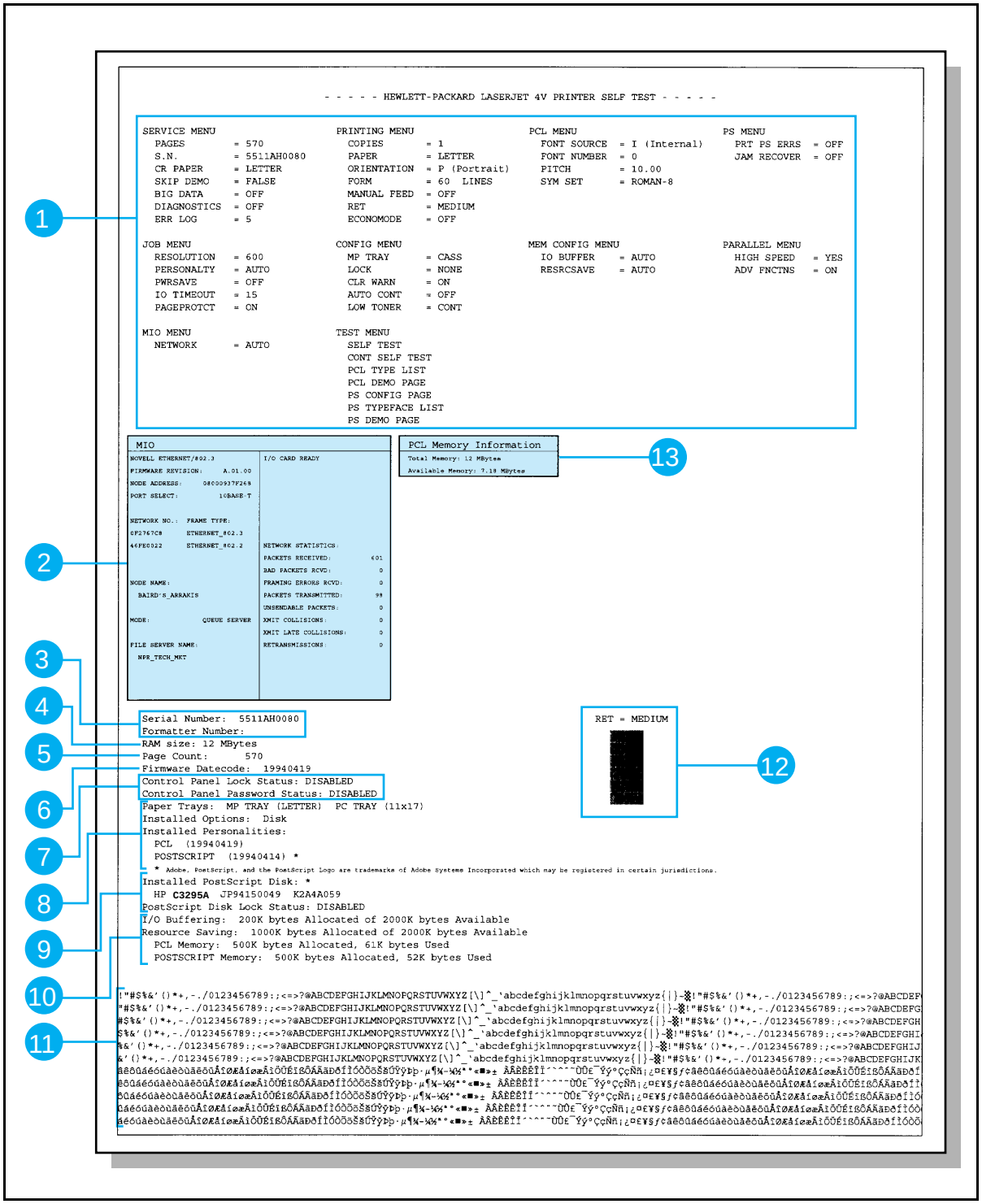


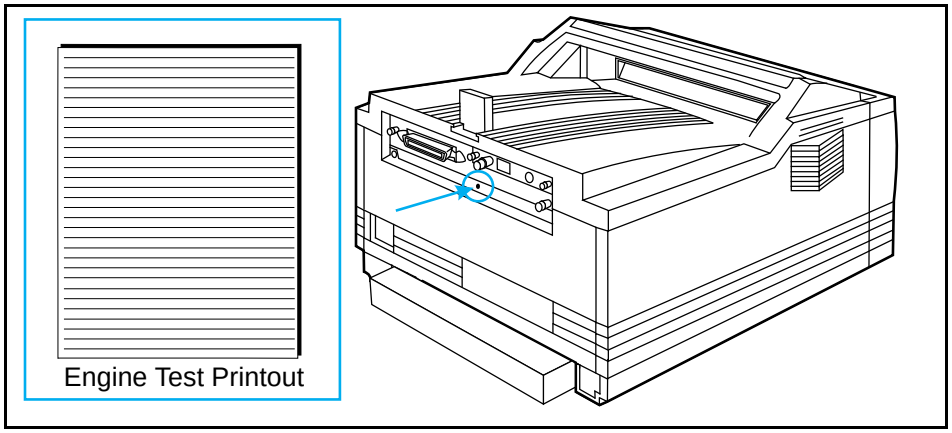
Figure 3-3 Self Test Printout (printed in Service Mode)

Engine Test

The engine test print can be used to verify that the print engine is functioning correctly. The Formatter PCA is completely bypassed during an engine test.

To print an engine test, use a non-metallic object to press the engine test button (see Figure 3-4). A single test page is printed.

Figure 3-4



Engine Test

Resetting the Printer

Simple Reset

A simple reset does the following:

- Clears the page buffer.
- Removes all temporary typefaces and macros.
- Makes the current user-selected defaults “active” (making them the default values until you change them again).
- Purges the input buffer of the active I/O (the other I/O buffer is not affected).

To perform a simple reset:

1. Press **On Line** to take the printer off line. The **On Line** light goes off and `00 OFFLINE` appears on the display.
2. While holding down the **Shift** key, press **Reset** briefly.
3. `07 RESET` appears on the display. Then the printer returns to the on-line, `00 READY` state.

Cold Reset

Cold Reset clears all data from the printer memory and sets all the defaults back to the factory settings.

CAUTION

Performing a Cold Reset resets the JetDirect configuration. To avoid making changes to your configuration remove the JetDirect card before performing a cold reset.

If possible print a control panel self-test prior to performing a Cold Reset. This will document current settings for later reference.

To perform a cold reset:

1. Turn off the printer.
2. While holding the **On Line** key down, turn the printer on. `08 COLD RESET` appears briefly on the display, then `05 SELF TEST` appears. After about 30 seconds, `08 COLD RESET` reappears on the display, followed by `00 OFFLINE`. The cold reset is complete.
3. Press **On Line** to return the printer on line. `00 READY` appears on the display.

Menu of Resets

Additional reset options are available through the Menu of Resets. Use the Menu of Resets option with caution. It can result in loss of buffered page data or printer configuration data. You should only use it when:

- You wish to restore the default printer settings.
- Communication between the printer and computer is interrupted.
- You are using both the parallel I/O and MIO ports, and one of the ports is having problems.

To access the Menu of Resets:

1. Press **On Line** to take the printer off line.
2. Hold down both **Shift** and **Reset** for at least 10 seconds until `RESET=MENU` appears on the display.
3. Use **+** or **-** to cycle through the items.
4. Press **Enter** to select your choice of resets. An asterisk * appears by the reset option.
5. Press **On Line** to execute the reset.

The following table shows the three reset options.

Table 3-13 Menu of Resets

Option Selected	Printer Response	Explanation
`RESET=MENU`	`09 MENU RESET`	`RESET=MENU` performs a simple reset (see previous page) and restores most of the printer factory default settings. Items in the Config, Memory Configuration and Parallel Menus are not reset.
`RESET=ACTIVE I/O`	`09 RST ACTIVE I/O`	`RESET=ACTIVE I/O` clears the input and output buffers *for the active I/O only* and performs a simple reset.
`RESET=ALL I/O`	`09 RESET ALL I/O`	`RESET=ALL I/O` clears the input and output buffers *for all I/Os* and performs a simple reset.

4

Maintenance

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Cleaning Spilled Toner 4-4

NOTE This printer requires no regular maintenance except for routine cleaning procedures, described in this chapter.

Cleaning the Printer

To maintain the print quality, thoroughly clean the printer:

- Every time you change the toner cartridge.
- After printing approximately 7,500 pages.
- Whenever print quality problems occur.

Clean the outside of the printer with a lightly water-dampened cloth. Clean the inside with only a dry, lint-free cloth. Observe the warnings and cautions below.

WARNING! Before you begin these steps, turn the printer OFF and unplug the power cord to avoid shock hazard.

When cleaning around the front door area, avoid touching the fuser. It may be HOT.

CAUTION To avoid permanent damage to the toner cartridge, do not use ammonia-based cleaners on or around the printer.

Do not touch the transfer roller with your fingers. Contaminants on the roller can cause print quality problems.

Table 4-1

COMPONENT	CLEANING METHOD/NOTES
Outside Covers	Use a water-dampened cloth. Do not use solvents or ammonia-based cleaners.
Inside General	Use a dry, lint free cloth. Remove all dust, spilled toner, and paper particles.
Paper Pickup Rollers	Use a water-dampened lint-free cloth.
Registration Roller	Use a dry lint-free cloth.
Transfer Roller	Use a dry, lint-free cloth. DO NOT TOUCH with your fingers.
Anti-Static Teeth (adjacent to Transfer Roller)	Use a dry, lint-free cloth. WARNING!: The Anti-Static Teeth are extremely sharp.
Separation Pad	Use a dry lint-free cloth.
Fuser Assembly	Use a water-dampened lint-free cloth.

Cleaning Spilled Toner

Defective toner cartridges can develop leaks. In addition, after a paper jam has occurred, there may be some toner remaining on the rollers and guides inside the printer. The pages that print immediately after the jam may pick up this toner.

Clean spilled toner with a cloth slightly dampened in cold water. Do not touch the Transfer Roller with the damp cloth or with your fingers. Do not use a vacuum cleaner unless it is equipped with a micro-fine particle filter.

NOTE If toner gets on your clothing, use cold water to remove it. Hot water sets toner stains into fabric.

5

Functional Overview

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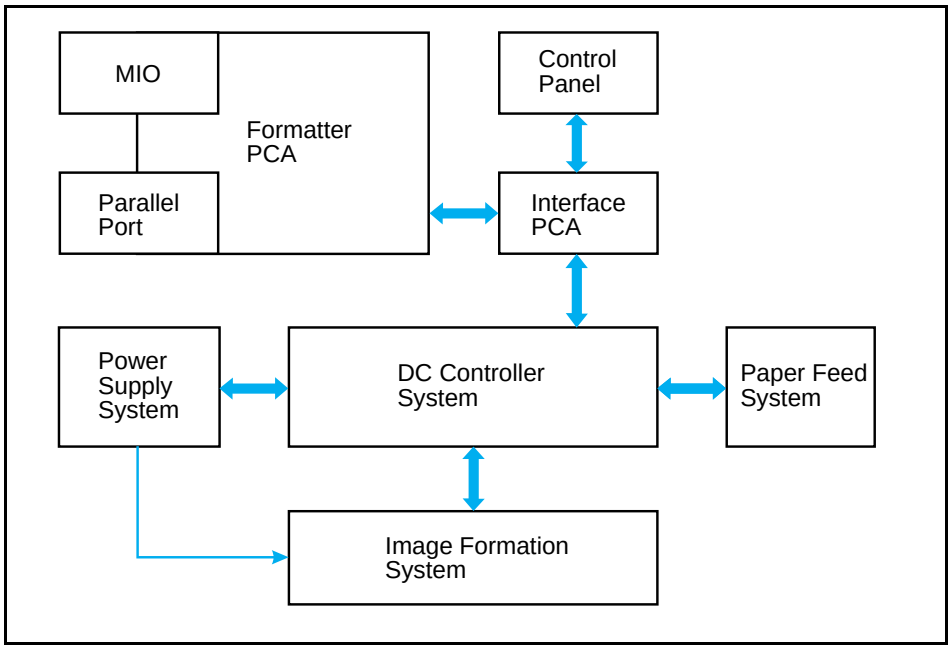
Basic Printer Functions

This chapter presents a generalized functional overview of the printer and the printing processes. The following printer systems are discussed:

- **Power Supply System**
- **DC Controller System**
- **Formatter PCA**
- **Control Panel**
- **Interface PCA**
- **Image Formation System**
- **Paper Feed System**
- **Basic Sequence of Operation**

Figure 5-1 is a generalized block diagram of the printer:

Figure 5-1



Printer Functional Block Diagram

Power Supply System

The AC and DC power supply circuits are contained on the Power Supply Unit, and the high voltage power circuitry is contained on the High Voltage Power Supply PCA. The Power Supply and Distribution System is illustrated in Figure 5-2.

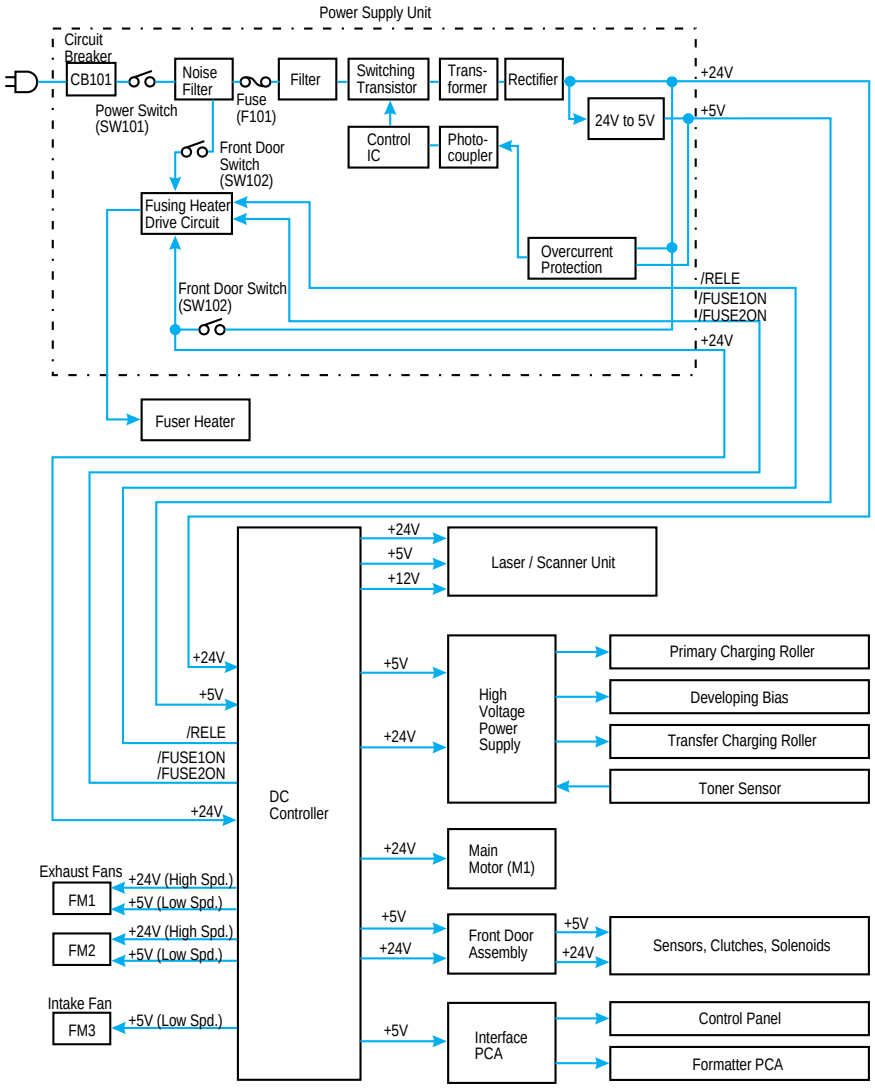


Figure 5-2 Power Supply/Power Distribution

AC Power Distribution

The AC power circuitry supplies AC voltage whenever the power cord is connected to the AC power source and the power switch is turned ON. A toner cartridge must be installed and the front door closed before voltage is supplied to the Power Supply circuits, the DC Controller, the Main Motor, or the Fusing Assembly.

Overcurrent/Overvoltage Protection

There are three overvoltage /overcurrent devices in this printer:

The resettable circuit breaker (CB101) shuts off AC input power to the Power Supply Unit in case of an AC overcurrent condition. To reset, remove the Upper and Right side covers and push on the small round button located directly above the ON/OFF switch.

Fuse F101 shuts off AC input power to the +24V DC and +5V DC power circuits. To check or replace the fuse requires the removal of the Power Supply Unit.

In addition, the +24V DC and +5V DC power circuitry contains an overcurrent protection circuit which automatically shuts off the output voltage when an overcurrent condition occurs due to a short or abnormal voltage on the load side. The protection circuit automatically resets after the input power is cycled OFF (for at least 3 minutes) then ON.

High Voltage Power Distribution

The High Voltage Power Supply PCA applies an overlap of DC and AC voltage to the primary charging roller and the developing roller. This circuit also applies a positive or negative DC voltage to the transfer charging roller according to the instructions from the CPU on the Formatter PCA.

This circuit also controls the image density by changing the primary AC voltage and the developing AC bias according to the setting of the print density dial.

Refer to Figure 5-15 for High Voltage Power Supply timing information.

Toner Cartridge Microswitch (SW501)

Microswitch SW501, located on the High Voltage Power Supply PCA , is activated by the toner cartridge. If the toner cartridge is not installed, the switch opens and an error is issued by the Formatter causing the display panel message `14 NO TONER CART` to be displayed. A toner cartridge must be installed and the front door must be closed before the printer can resume printing.

Print Density Adjustment

Adjusting print density affects the line width (boldness) of the print image. This is accomplished by varying the developer DC bias, which controls the amount of toner applied to the photosensitive drum. The Print Density control is accessible behind the front door. The point of the dark arrow is the most reduced density setting and the thick end of the dark arrow is the most increased density setting. The default setting is at center range.

DC Controller System

The following systems and functions are controlled by the DC Controller:

- DC Power Distribution
- Laser and Scanner Drive
- Paper Motion Monitoring and Control
- Clutches, (Registration, Cassette Pickup, and MP Tray Pickup)
- Engine Test Microswitch
- Motors (Main Drive, Scanner, and Fans)

Figure 5-2 shows the Power Supply and Distribution System. Refer to the wiring diagrams at the end of Chapter 7 for detailed listings of the DC Controller inputs and outputs.

DC Power Distribution

The DC power distribution circuitry, located on the DC Controller PCA, distributes +5 V dc, +12 V dc, and +24 V DC as follows:

+5 V dc:	Control Panel Formatter PCA Photosensors (PS401, PS402) DC Controller Circuitry Laser/Scanner Assembly Exhaust Fans, FM1 and FM2 (low speed) Intake Fan, FM3
+12 V dc:	Laser/Scanner Assembly
+24 V dc:	Laser/Scanner Assembly High Voltage Power Supply Clutches and Solenoids Exhaust Fans, FM1 and FM2 (high speed)

Laser and Scanner Drive

Based on information received from the Formatter, the DC Controller sends signals to the Laser/Scanner Assembly to modulate the laser diode ON and OFF and to drive the Laser/Scanner motor. Refer to “Image Formation System,” later in this chapter for more information.

Paper Motion Monitoring and Control

The DC Controller PCA controls paper motion by continuously monitoring the various paper sensors, and coordinating the timing with the other print processes.

For a detailed explanation of paper movement, and the interaction of photosensors and solenoids with the paper movement process, refer to the section “Paper Feed System,” later in this chapter.

Clutches

The drive signals for the Registration Clutch (CL1), Cassette Pickup Clutch (CL2), and the MP Tray Pickup Clutch (CL3) are provided by the DC Controller PCA.

Engine Test Microswitch (SW7001)

Microswitch SW7001, located on the DC Controller, is activated manually through an access hole at the rear of the printer. This switch causes the print engine to perform a self test diagnostic which bypasses the Formatter PCA and print a full page of black parallel lines. This test is useful for troubleshooting printer problems because it isolates the print engine from the Formatter PCA.

Motors

The **Main Motor (M1)** is controlled by the DC Controller PCA. The Main Motor drives the Main Drive Assembly and rotates during the Initial Rotation period (following initial power-ON), the Print period, or the Last Rotation Period, or whenever the printer front door is opened and closed.

The **Scanner Motor** is controlled and monitored by the DC Controller. It rotates the scanner mirror during the Initial Rotation period and the Print period.

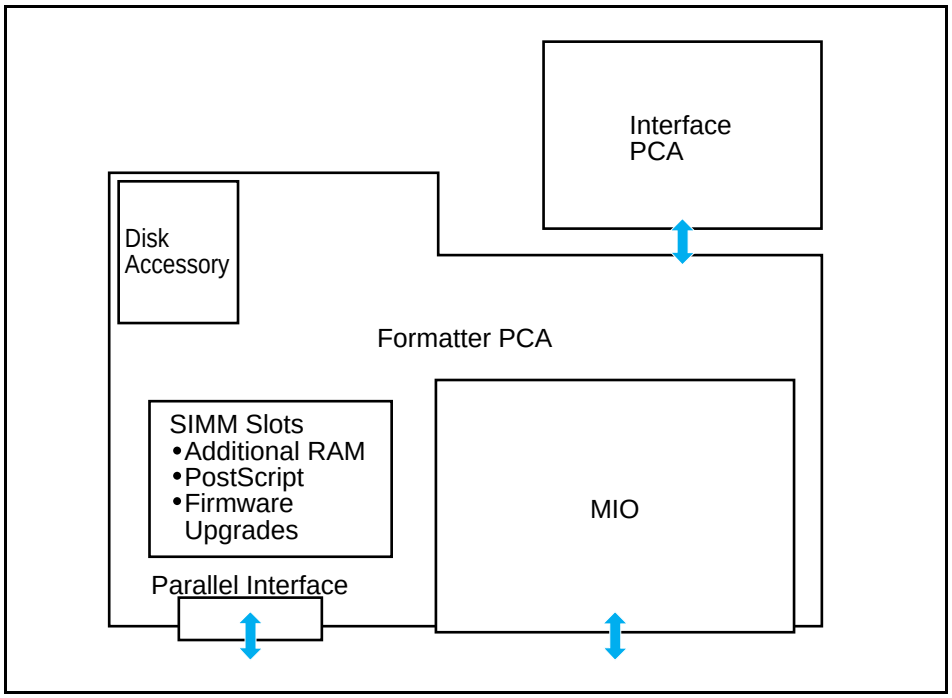
The **Fan Motors (FM1, FM2, and FM3)** are controlled and monitored by the DC Controller PCA. The Intake Fan (FM3) operates continuously, and the Exhaust Fans (FM1 and FM2) operate at low speed in the Standby Mode, and at high speed during the Initial Rotation, Print and Last Rotation periods. The exhaust fans turn off in the Power Save mode after the Fuser cools down.

Formatter System

The Formatter PCA is responsible for the following:

- Controlling the Power Save mode.
- Receiving and processing print data from the various printer interfaces.
- Monitoring front control input and relaying printer status information (through the front control and the Bi-Directional I/O).
- Developing and coordinating data placement and timing with the print engine.
- Storing font information.
- Communicating with the host computer through the Bi-Directional Interface.

Figure 5-3



Formatter PCA Block Diagram

The Formatter PCA receives print data from the Bi-Tronics Interface and converts it into a dot image. The DC Controller synchronizes the Image Formation System with the Paper Feed System, and signals the Formatter to send the print image data. The Formatter sends the print image data (dots) in the form of a VIDEO signal and the printing process begins.

The Formatter PCA also provides mounting locations for the MIO PCA, additional memory SIMMs, the PostScript SIMM, and the Disk Accessory.

Power Save

This user-adjustable feature conserves power by shutting down the fuser and exhaust fans after the printer has been idle for 15 minutes, 30 minutes, 1 hour, 2 hours, or 3 hours. A 10 second interval is also available in Service Mode. The printer retains all printer settings and downloaded fonts and macros while in Power Save mode. The default setting is Power Save ON, with a 15 minute idle time. (Power Save can also be turned OFF from the control panel.)

The printer exits Power Save mode and enters the warm up cycle when any of the following occur:

- A job is printed.
- A control panel key is pressed.
- The printer front door is opened and closed.
- A paper cassette is removed or installed.

NOTE Printer error messages override the Power Save message. The printer will enter Power Save mode at the appropriate time, but the error message will continue to be displayed.

Resolution Enhancement (REt)

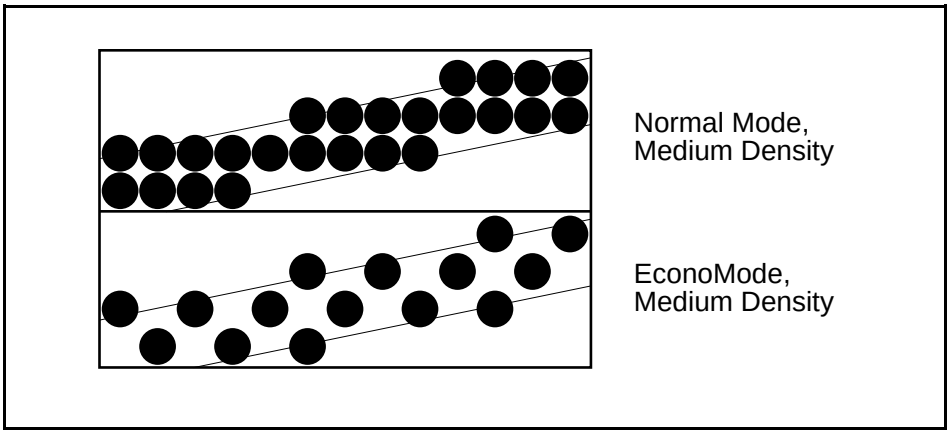
The Formatter PCA contains circuitry for Resolution Enhancement technology (REt), which modifies the standard video dot data on its way to the DC Controller to produce “smoothed” black-to-white boundaries. REt is user-adjustable from the control panel, or from some software applications. Available settings are Light, Medium, Dark, or Off. The default setting is Medium.

NOTE REt settings sent from software or printer drivers override any control panel settings.

EconoMode

The EconoMode setting uses approximately 75% less toner than standard mode printing by reducing the dot density. However, Economode does not extend toner cartridge component life. EconoMode, which can also be thought of as “draft mode,” is user selectable via a control panel key and some software applications. The default setting is Off.

Figure 5-4



EconoMode vs Normal Mode

NOTE EconoMode does not affect print speed, memory usage, or extend toner cartridge life.

Input/Output

Parallel Interface

The Formatter PCA receives incoming data through its Bi-Tronics interface (IEEE 1284). The Bi-Tronics I/O provides high speed and two-way communication between the printer and the host, allowing the user to change printer settings and monitor printer status from the host computer. The "High Speed (Yes/No)" configuration item is user-selectable. The default setting, "Yes" allows the I/O to run at the higher speeds supported by most newer PCs. When set to "No," the parallel interface runs at the slower, but compatible mode for older PCs. The "Advanced Functions (On/Off)" configuration item is also user-selectable. The default setting, "On" allows for two-way parallel communications. The "Off" mode disables the advanced functionality. The Bi-Tronics I/O is compatible with the Centronics parallel interface standard.

NOTE Refer to "Parallel Cable Pin Configuration" in Appendix B for parallel pin assignments.

Modular I/O (MIO)

The optional Modular I/O card can be installed in the slot provided on the Formatter PCA. It provides automatic I/O switching between multiple computers or networks connected to the printer. The LaserJet 4MV printer includes the J2552A HP JetDirect Multi-protocol Network Card with LocalTalk, DIN-8, and Ethernet/IEEE802.3 10Base-T, BNC.

LocalTalk I/O

The printer implements AppleTalk networking protocol through LocalTalk hardware. The LocalTalk network cable (HP P/N 92215N) is connected through the MIO card accessible from the printer rear panel. (See Appendix B for more cabling information.)

CPU

The Formatter PCA incorporates the Intel 80960CF microprocessor operating at 33.33 MHz.

Printer Memory

NOTE If the printer encounters difficulty managing available memory, a Clearable Warning message will be displayed on the Control Panel. Refer to "Clearable Warnings" in Chapter 7 for details.

Read Only Memory (ROM)

Besides storing microprocessor control programs, the ROM stores dot patterns of internal character sets (fonts).

Random Access Memory (RAM)

The RAM contains the page and I/O buffers and the font storage area. It stores printing and font information received from the host system, and can also serve to temporarily store a full page of print image data before the data is sent to the print engine (see "Page Protect"). RAM memory capacities for each printer are shown under "Printer Features" in Chapter 1. Memory capacities can be increased by adding SIMMs to the Formatter PCA. Note that adding memory (SIMMs) may also increase print speed when printing complex graphics.

SIMM Slots

The SIMM slots may be used to add memory, fonts, the PostScript Language SIMM, or firmware upgrades.

The optional PostScript language SIMM can be installed in any of the SIMM slots on the Formatter PCA. It allows the printer to automatically receive and print files configured in the Adobe PostScript language . An additional 8-Mbytes of memory is recommended for PostScript printing.

Non-Volatile Memory (NVRAM)

The printer uses NVRAM to store I/O and print environment configuration information. The contents of NVRAM are retained when the printer power is turned off or disconnected.

Disk Accessory

The optional Disk Accessory is mounted on the rear of the Formatter PCA. It can be used to permanently store downloaded Adobe PostScript fonts and forms in the printer. The disk provides 42.8 Mbytes of storage area for these functions.

Memory Enhancement technology (MEt)

The Hewlett-Packard Memory Enhancement technology (Met) effectively doubles the standard memory through a variety of font and data compression methods.

NOTE MEt is only available in PCL mode; it is not functional when printing in PostScript mode.

Page Protect

Page complexity (rules, complex graphics or dense text) may exceed the printer's ability to create the page image fast enough to keep pace with the Image Formation process. If Page Protect is disabled, and a page is too complex, it may print in parts (for example, the top half on one page and the bottom half on the next page). Some print data loss is likely in these instances, and the printer will display the `21 PRINT OVERRUN` error message.

Page Protect allows the Formatter to create the entire page image in page buffer memory before physically moving the paper through the printer. This process ensures that the entire page will be printed. Page Protect applies only to PCL printing. The default setting is Auto.

PJL Overview

Printer Job Language (PJL) is an integral part of configuration, in addition to the standard Printer Command Language (PCL). With standard Centronics cabling, PJL allows the printer to perform functions such as:

- **Two-way communication** with the host computer through a Bi-directional Parallel connection. The printer can tell the host such things as the control panel settings, and allow the control panel settings to be changed from the host.
- **Dynamic I/O switching** allows the printer to be configured with a host on each I/O. The printer can receive data from more than one I/O simultaneously, until the I/O buffer is full. This can occur even when the printer is off-line.
- **Context-sensitive switching** allows the printer to automatically recognize the personalities (PostScript or PCL) of each job and configure itself to serve that personality.
- **Isolation of print environment settings** from one print job to the next. For example, if a print job is sent to the printer in landscape mode, the subsequent print jobs print in landscape only if they are formatted for landscape printing.

PML

PML is a Printer Management Language that allows remote configuration and status readback through the I/O ports.

Control Panel

The Formatter PCA sends and receives printer status and command data via a Control Panel PCA. The Control Panel consists of a 16-character display window and an 8-key keypad. Control Panel messages can be configured in any of several languages. Refer to “Using the Control Panel,” in Chapter 3, and to “Printer Message Troubleshooting” in Chapter 7, for more information.

The eight keys on the keypad are used for a variety of functions (see Chapter 3). Keyboard overlays are available in any of several different languages (see Chapter 8 for part numbers).

Interface PCA

The Interface PCA provides the interconnections between the Formatter PCA, the Control Panel and the DC Controller PCA. Refer to Figure 5-1 and the Main Wiring diagram at the end of Chapter 7. The Interface PCA is located inside the Card Cage Assembly and contains no active circuitry.

Image Formation System

Laser printing requires the interaction of several different technologies (such as electronics, optics, and electrophotographics) to provide a printed page. Each process functions independently and must be coordinated with the other printer processes. Image formation consists of six processes:

1. **Drum Cleaning**
2. **Drum Conditioning**
3. **Image Writing**
4. **Image Developing**
5. **Image Transferring**
6. **Image Fusing**

Figure 5-5

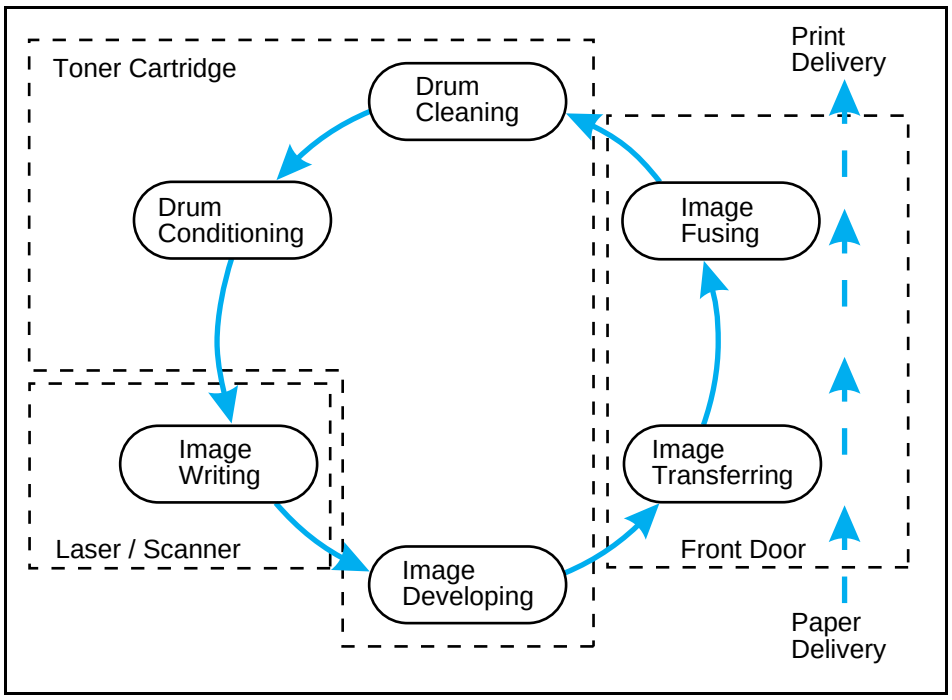


Image Formation Block Diagram

Toner Cartridge

The toner cartridge is the “heart” of the Image Formation System. It houses the cleaning, conditioning, and developing steps of the process. The toner cartridge contains the photosensitive drum, primary charging roller, developing station, toner cavity, and cleaning station. Including these components that wear, degrade, or are consumed in the replaceable toner cartridge eliminates the need for a service call when replacement is required.

Toner Cartridge/High Voltage Power Supply Contacts

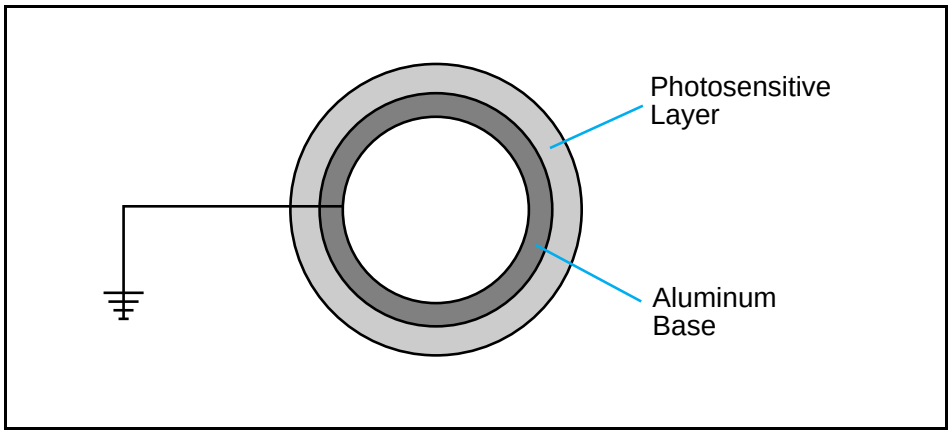
The toner cartridge has three contacts which route voltage from the HVPS PCA. They are:

- Upper: Primary Charge
- Middle: Developing Bias
- Lower: Toner Sensing

The Photosensitive Drum

The special properties of the photosensitive drum allow an image to be formed on the drum surface and then transferred to paper. The drum is an aluminum cylinder. The outside of the cylinder is coated with a layer of organic-photoconductive material (OPC) which is non-toxic. The OPC material has properties similar to a photo-resistor. It becomes electrically conductive when exposed to light. When exposed to light, the negative charges deposited on the drum are conducted to the ground potential of the drum base. Areas not exposed to light remain non-conductive and maintain their negative charge. The aluminum base of the photosensitive drum is electrically connected to ground potential.

Figure 5-6

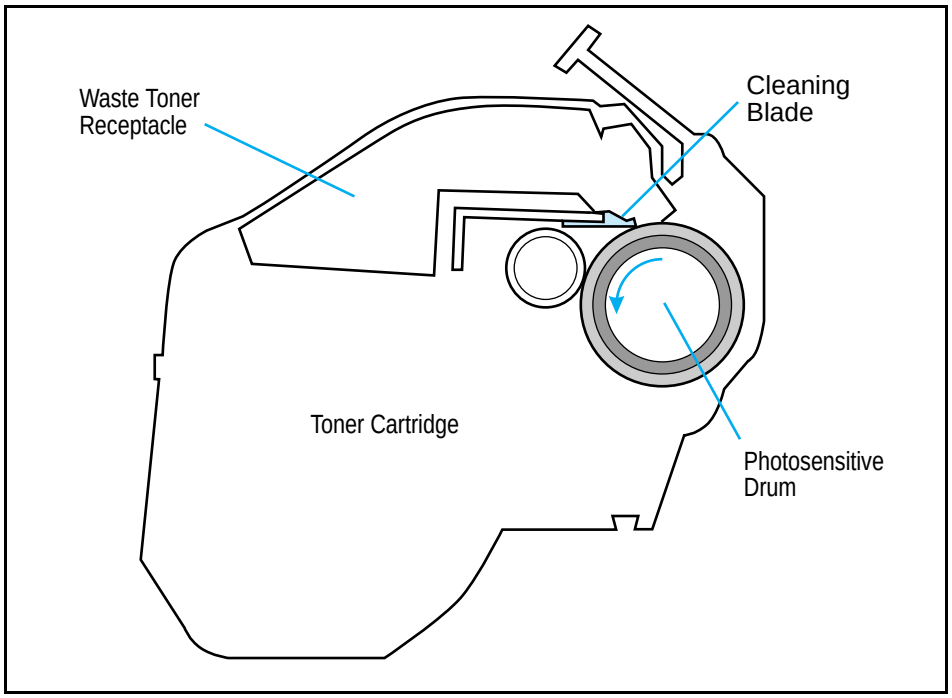


Photosensitive Drum

Drum Cleaning

The cleaning blade is in contact with the surface of the drum at all times. As the drum rotates during printing, excess toner is stored in the waste toner receptacle.

Figure 5-7

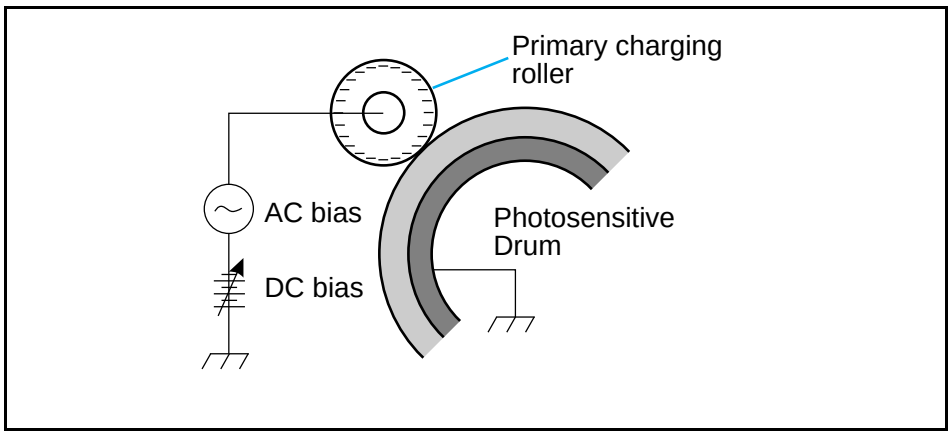


Drum Cleaning

Drum Conditioning

After the drum is physically cleaned, it must be conditioned. This process consists of applying a uniform negative charge on the surface of the drum with the primary charging roller, located in the toner cartridge. The primary charging roller is coated with conductive rubber with an AC bias applied to erase any residual charges and maintain a constant drum surface potential. In addition, a negative DC bias is applied by the charging roller to create a uniform negative potential on the drum surface. The amount of DC voltage is modified by the print density setting.

Figure 5-8



Primary Charging Roller

Image Writing

During the writing process, a modulated laser diode projects the beam onto the rotating six-sided scanning mirror. As the mirror rotates, the beam reflects off the mirror, through a set of focusing lenses, through a slot in the rear of the toner cartridge, and onto the photosensitive drum. The beam sweeps the drum from left to right, discharging the negative potential wherever the beam strikes the surface. This creates a latent electrostatic image, which later is developed into a visible image (see Figure 5-9).

Figure 5-9

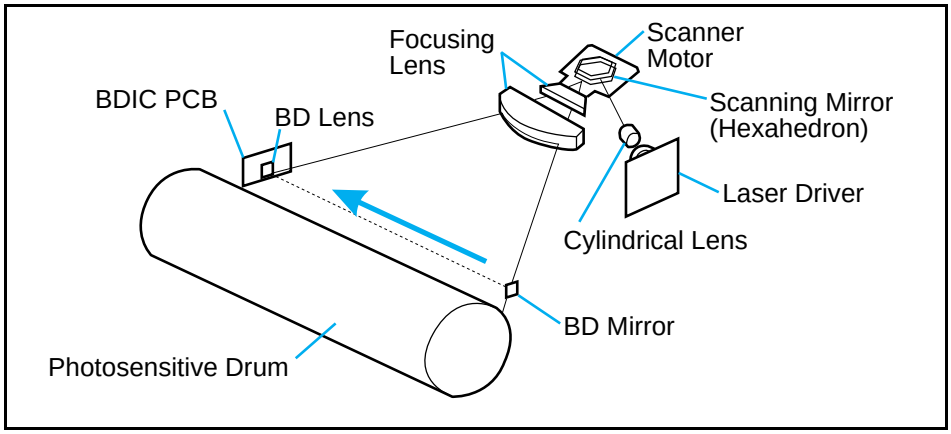


Image Writing

Because the beam is sweeping the entire length of the drum and the drum is rotating, the entire surface area of the drum can be covered. The speed of the scanner motor (which turns the scanning mirror) and the speed of the main motor (which turns the drum) are synchronized, and each successive sweep of the beam is offset 1/600th of an inch. The beam can be turned on and off to place a dot of light every 1/600th of an inch. This is how the printer achieves its 600 x 600 dpi resolution. After the writing process, the drum surface has an invisible (latent) electrostatic image.

At the end of each sweep, the beam strikes the beam detect lens, generating the Beam Detect Signal (BD). The BD signal is sent to the DC Controller, where it is converted to an electrical signal used to synchronize the output of data (VDO) for one sweep (scan line) and to diagnose problems with the laser diode or scanner motor.

Image Developing

The developing process develops the latent electrostatic image into a visible image on the drum. The developing unit consists of a metallic cylinder that rotates around a fixed magnetic core inside the toner cavity. Toner is a powdery substance made of black plastic resin bound to iron particles, which is attracted to the magnetic core of the cylinder. A rubber blade "brushes" the toner on the developing cylinder to a uniform thickness.

The toner particles obtain a negative surface charge by rubbing against the developing cylinder which is connected to a negative DC supply. The negatively charged toner is attracted to the discharged (exposed, grounded) areas of the drum, and repelled from the negatively charged (non-exposed) areas. An AC potential is applied to the developing cylinder to decrease the attraction between the toner and the magnetic core of the cylinder, and to increase the repelling action of toner against the areas of the drum not exposed to laser light. This AC potential improves density and contrast.

Figure 5-10

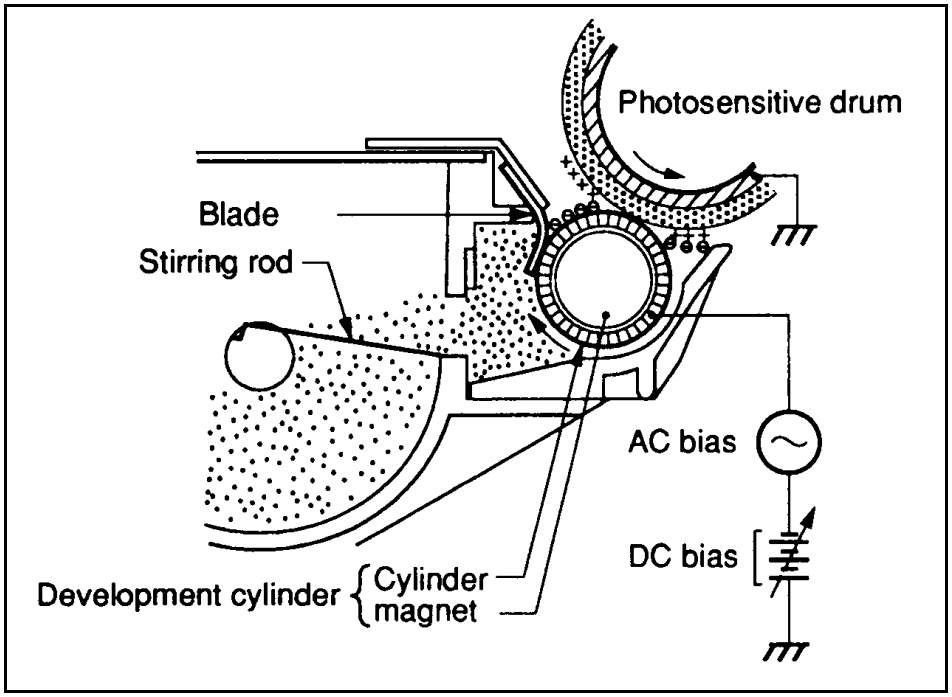


Image Development

The Print Density control (behind the front door) adjusts the DC bias of the developing cylinder by changing the force of attraction between the toner and drum. A change in DC bias causes either more or less toner to be attracted to the drum, which in turn either increases or decreases the print density. Both the primary and developer DC bias voltages are changed in response to the density setting.

Image Transferring

During the transferring process, the toner image on the drum surface is transferred to the paper. A positive charge applied to the back of the paper, by the transfer roller causes the negatively charged toner on the drum surface to be attracted to the page.

The small diameter of the drum, combined with the stiffness of the paper causes the paper to peel away from the drum. The static eliminator teeth also help separate the paper from the drum. The static eliminator teeth weaken the attractive forces between the negatively charged drum surface and the positively charged paper. Without this help, thin paper may wrap around the drum. After separation, the drum is cleaned and conditioned for the next image.

Figure 5-11

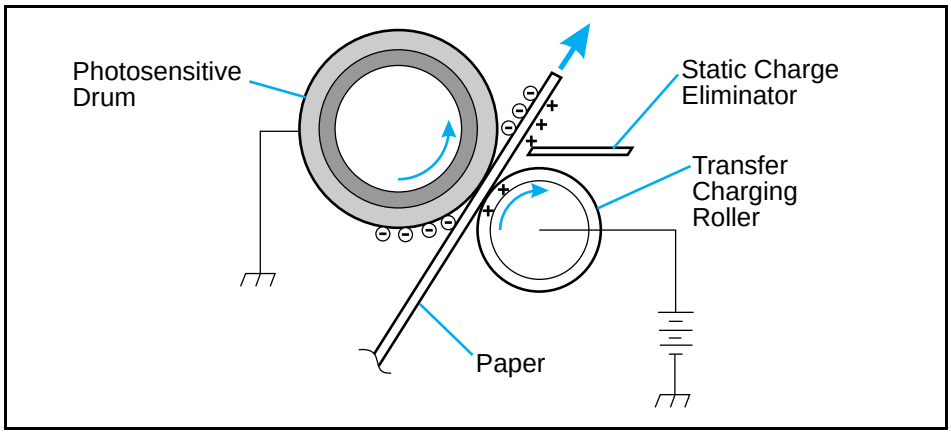


Image Transferring

Image Fusing

During the fusing process, the toner is fused into the paper by heat and pressure to produce a permanent image. The paper passes between a heated fusing roller and a soft pressure roller. This melts the toner and presses it into the paper.

The fusing roller contains a quartz-halogen lamp that provides heat for the fusing process. Fusing temperature is monitored by the DC Controller PCA, via thermistor TH1. The DC Controller maintains a temperature of about 180° C during print mode. If the fusing system overheats (about 220° C), a relay opens, interrupting power to the fusing heater, causing a fuser error (50 SERVICE) message. If the fusing system exceeds 240° C, the thermal fuse will open, cutting off power to the fuser.

Figure 5-12

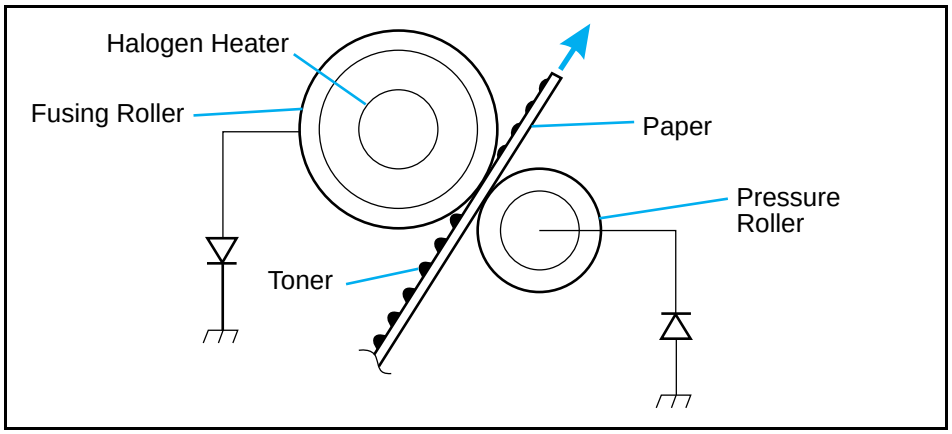


Image Fusing

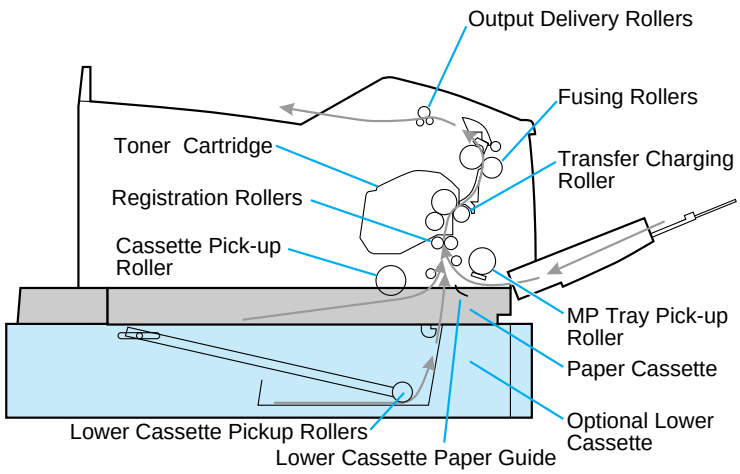
Paper Feed System

Paper Path

The paper feed system picks print media automatically from the paper cassette, optional lower cassette, or accepts it from the MP Tray, and delivers it to the image formation system at precisely the right time. The system then feeds the media to the fusing station, and delivers the finished product to the output bin on top of the printer.

Figure 5-13 shows a simplified paper path and the approximate location of the major components.

Figure 5-13



Paper Path

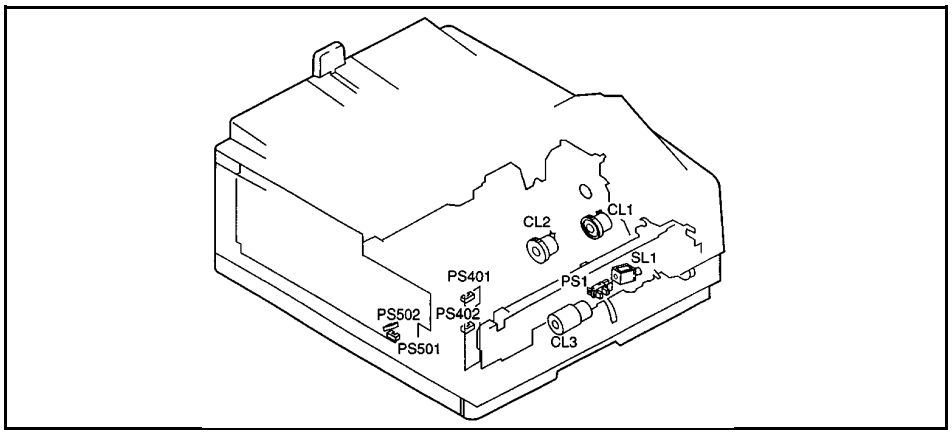
NOTE: The Paper Cassette and Lower Cassette Paper Guide must be in place for the Optional Lower Cassette to operate properly.

When the optional lower cassette is installed it becomes the default paper source.

Clutches and Sensors

Figure 5-14 shows the locations of the various solenoids, photosensors and rollers.

Figure 5-14



Clutches and Sensors

Table 5-1 Clutches and Sensors

No.	Name	Description
PS1	MP Tray paper sensor	Senses paper in the MP Tray.
PS401	Delivery Unit paper sensor	Senses paper in the fuser area.
PS402	Front Door Open sensor	Senses position of the printer front door.
PS501	Pickup Unit paper sensor	Senses paper in the registration roller area.
PS502	Cassette paper sensor	Senses presence of paper in the lower cassette.
CL1	Registration clutch	Engages the registration rollers.
CL2	Cassette pickup clutch	Engages the cassette pickup rollers.
CL3	MP Tray pickup clutch	Engages the MP Pickup roller.
SL1	Intermediate plate pressurization solenoid	Releases the spring-loaded plate, allowing paper to contact the MP roller.

Printing from the Paper Cassette

Paper motion begins when the DC Controller PCA, after receiving a PRINT signal, starts the Scanner Motor, the Main Motor, and the fusing heater. The Cassette Pickup Clutch (CL2) is energized for 0.5 seconds, the pickup roller and the registration roller rotate and feed a sheet of paper from the Paper Cassette to the Registration Position, where the registration roller is stopped by the Registration Clutch (CL1), if necessary, until the Scanner and Fuser are ready.

The DC Controller sends the VSREQ signal to the Formatter PCA within a specified amount of time after the Pickup Unit Photosensor (PS501) is activated. The leading edge of the media is now ready to proceed to the photosensitive drum. When the print engine receives the VSYNC and VDO signals, the printing process begins. After the paper passes by the drum, and through the fusing unit, it triggers the Delivery Unit Photosensor (PS401). The paper is then fed through the output rollers and to the top output bin.

Printing from the MP Tray

The presence of paper in the Multipurpose (MP) Tray is detected by the MP Tray Paper Sensor (PS1). The intermediate plate pressurization solenoid (SL1) is then activated, releasing the plate which applies upward pressure on the paper, causing it to contact the MP pickup roller. The MP Pickup Clutch (CL1) turns on at this time, allowing the registration roller to rotate. This feeds the paper from the MP Tray to the registration position.

The remainder of the MP Tray print process is identical to the cassette feed process, described above.

Printing from the Optional Lower Cassette

When printing from the optional lower cassette, any of the 250-sheet paper cassettes must also be in place. The Pickup Arm in the optional lower cassette feeds the paper upward through a guide slot in the 250-sheet cassette to the Registration Roller. Once there, the operation is the same as printing from a standard paper cassette.

Paper Jam Detection

The Pickup Unit photosensor (PS501) in the registration area and Delivery Unit photosensor (PS401) in the output area detect when paper is moving through the printer (see Figure 5-14 for sensor locations). If a paper jam is detected, the DC Controller immediately stops the printing process and causes a `13 PAPER JAM` message to be displayed on the control panel.

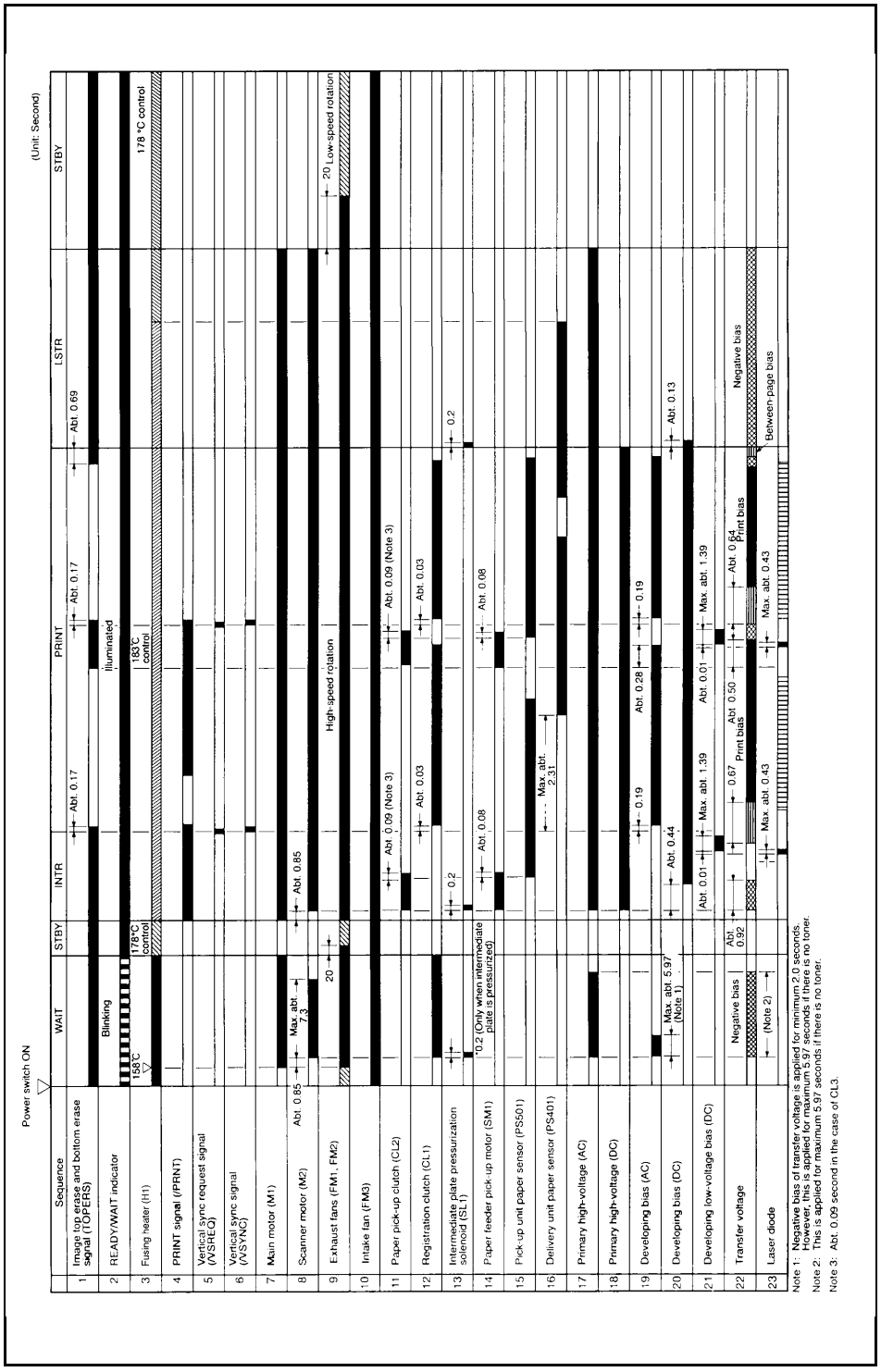
Basic Sequence of Operation

The Formatter PCA and the DC Controller PCA share information during printer operation. The Interface PCA forms a link which operates as a serial data bus. This allows printer status, command, and dot-image data to be passed between the two PCAs. Figure 5-15 shows the general timing of the printer events. The following events take place during normal printer operation:

Table 5-2 Printer Timing

Period	Timing	Purpose
WAIT	From power ON to the end of Main Motor initial rotation.	Clear the drum surface potential and clean the Transfer Roller.
STBY (standby)	From the end of the WAIT or the LSTR period until the input of the PRNT signal from the Formatter. Or from the end of the LSTR period until power OFF.	Maintain the printer in ready state.
INTR (initial rotation)	From the input of the PRNT signal from the Formatter until the laser diode intensity has been stabilized.	Stabilize the photosensitive drum sensitivity in preparation for printing. Also clean the Transfer Roller.
PRNT	From the end of initial rotation until the Scanner Motor stops.	Form images on the photosensitive drum based on the /VDO signal from the Formatter and transfer the image to paper.
LSTR (last rotation)	From the primary voltage (DC) OFF until the Main Motor stops. If another PRNT signal is sent from the Formatter, the printer returns to the INTR period. If not, it returns to the STBY period.	Deliver the last sheet of paper. Also clean the Transfer Roller.

Figure 5-15



General Timing Diagram

6

Removal and Replacement

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Removal and Replacement Strategy

This chapter documents removal and replacement of major assemblies.

Replacement is generally the reverse of removal. Occasionally, information is included to provide direction for difficult or critical replacement procedures.

WARNING!

Unplug the power cord from the power outlet before attempting to service the printer. If this warning is not followed, severe injury may result.

Never operate or service the printer with the protective cover removed from the Laser/Scanner assembly. The reflected beam, although invisible, can damage your eyes.

This printer has some sharp sheet metal edges which can cause injury.

CAUTION

The printer contains parts that are electrostatic discharge (ESD) sensitive. Always service printers at an ESD protected workstation. Watch for the ESD reminder shown at left while performing removal procedures.

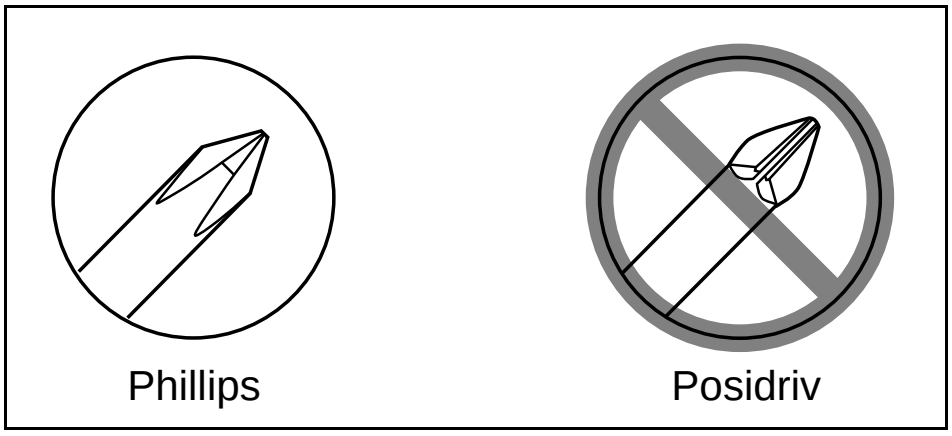
Required Tools

- #2 Magnetized Phillips Screwdriver (6-inch shaft)
- #2 Stubby Magnetized Phillips Screwdriver (1-inch shaft)
- Small flat-blade Screwdriver
- Small Pair Needle Nose Pliers

All screws used in field-replaceable printer components are Phillips head screws which require a #2 size Phillips screwdriver. Figure 6-1 shows the difference between a Phillips and a Pozidriv screwdriver. Note that the Phillips tip has more beveled surfaces.

CAUTION A Posidriv screwdriver will damage the screw heads. Use Phillips only.

Figure 6-1

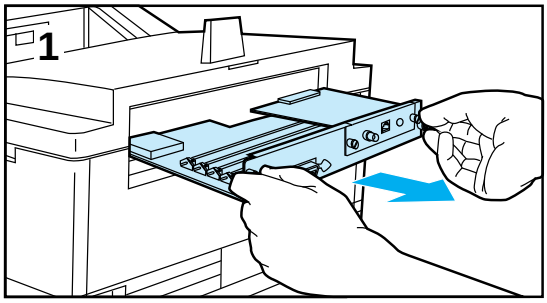


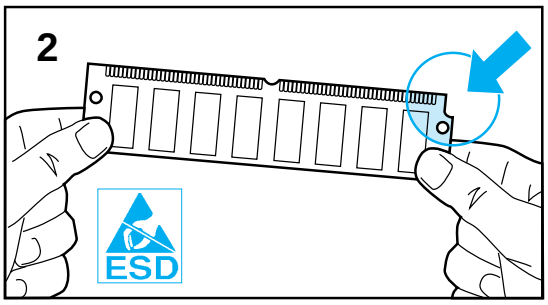
Phillips vs. Posidriv Screwdrivers

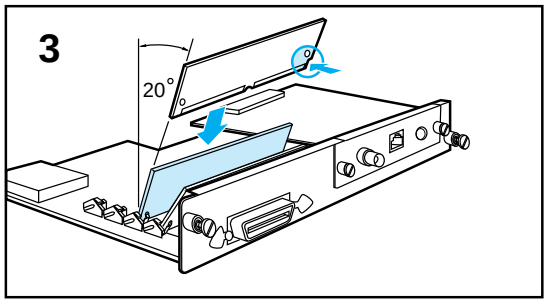
NOTE See Chapter 8 for a table listing screws and other common hardware used in the printer.

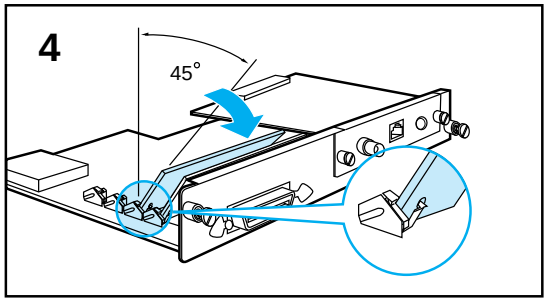
CAUTION To install a self-tapping screw, first turn it counter-clockwise to align it with the existing thread pattern, then carefully turn clockwise to tighten. **Do not over-tighten.** If a self-tapping screw-hole becomes stripped, repair of the screw-hole or replacement of the affected assembly is required.

User Installable Accessories







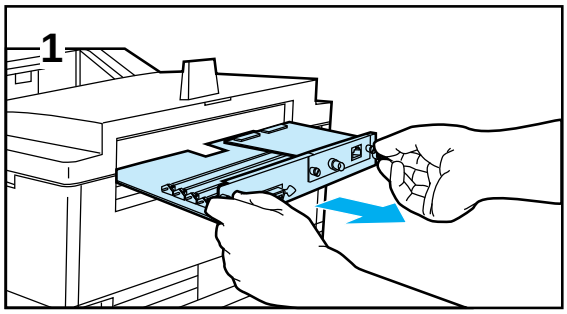


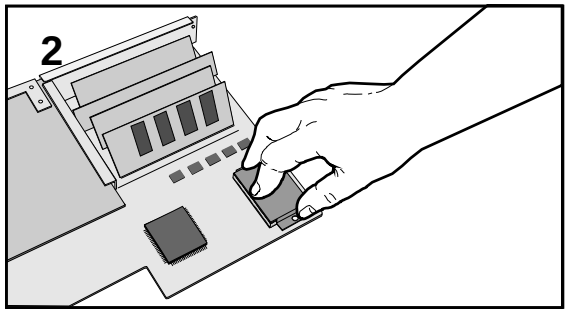
Memory Upgrade

CAUTION

SIMMs and the Formatter PCA can be damaged by small amounts of electro-static discharge (ESD). Wear an anti-static wrist strap.

1. With the printer OFF and unplugged, loosen the two captive screws and remove the Formatter PCA.
2. Remove the SIMM from the anti-static package. Hold the board with your forefingers on the side edges and your thumbs against the back edge, so the notch on one end is on the right and the metal teeth face toward the SIMM slot (match the positioning shown in frame 2).
3. Insert the board firmly into the SIMM slot at about a 20-degree angle. Use closest open slot toward the back of the printer.
4. Rotate the SIMM toward the back of the printer to a 45-degree angle until it clicks into the metal locking tabs. If it is properly seated, it will not lift away from the slot. (To remove a SIMM, you must first release the metal locking tabs.)
5. Slide the printer Formatter PCA back into the printer and tighten the two screws.
6. Re-attach any cables and the power cord, then switch the printer ON and print a self-test to verify the new memory is available. If the SIMM is not recognized, turn the printer OFF and reseat the SIMM. If an error occurs, refer to "Service and Error Messages" in Chapter 7.





Disk Accessory

The Disk Accessory is housed under a protective plastic cover on the left rear corner of the Formatter PCA. The plastic cover and the disk should be removed as one piece.

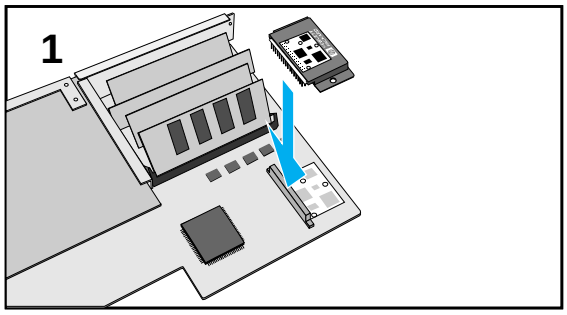
1. With the printer OFF and unplugged, loosen (2) captive screws and remove the Formatter PCA. Place the PCA face-up on an ESD-safe surface.
2. The disk assembly is connected to the Formatter PCA with two plastic locking pins and a 50 pin connector. Grasp the two sides of the disk cover near the locking pins and lift firmly upward. The locking pins will release along with the connector pins of the disk.

To Reinstall:

NOTE

The PostScript option must be installed and operating before installing the Disk Accessory.

1. Hold the disk by the side edges of the cover and align it with the diagram printed on the formatter board. Align the connector pins carefully to prevent bending or mis-alignment. Align the cover locking pins with the holes in the formatter board.



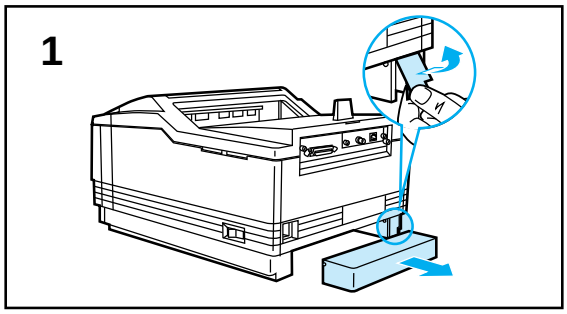
CAUTION

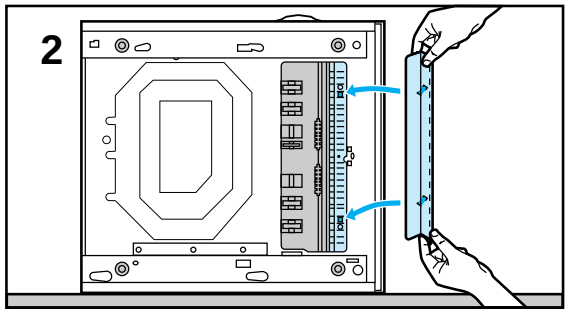
Never press on the center of the disk. Press only on the edge of the cover directly above the connector to prevent damage to the disk. Carefully press the connector pins and cover locking pins into place. Check the connector pins for proper seating. Re-seat as necessary.

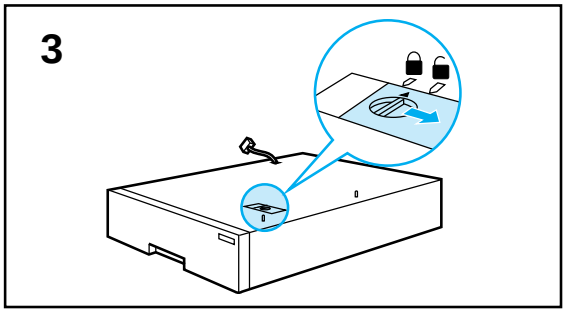
2. Print a PostScript Configuration page (PS CONFIG PAGE) from the control panel. Verify the entry under “Disk Accessory” reads “Disk Installed: YES” and lists available capacity.

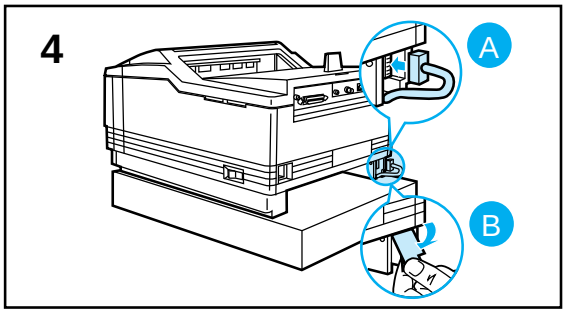
NOTE

When the disk drive is replaced, all fonts and macros must be re-loaded.









Optional Lower Cassette

The Optional Lower Cassette requires installation of a Lower Cassette Paper Guide on the bottom of the printer, as well as connection of a cable to the rear of the left foot. Before beginning, unplug the printer from the power source and remove the toner cartridge and paper cassette.

WARNING!

Get another person to help handle the printer.

1. Remove 11 x 17 / A3 Paper Cassette dust cover and cable connector cover from back of printer.
2. Turn the printer onto its right side (NOT the side with exhaust vents). Install the Lower Cassette Paper Guide and return the printer to upright position.
3. Release Lower Cassette shipping lock to unlocked position, and set the printer onto the Lower Cassette base, being careful to align the locater pins.
4. Connect the Lower Cassette base cable into the connector (A), and replace the cable connector cover (B).

NOTE:

The Paper Cassette and Lower Cassette Paper Guide must be in place for the Lower Cassette to operate properly.

When the Lower Cassette is installed, it becomes the default paper source.

Covers and Doors

The printer covers are in four separate components: the Upper Cover (includes the Control Panel), the Left and Right Side Covers, and the Rear Cover.

Control Panel

The Control Panel Assembly includes the Control Panel PCA and its plastic cover as shown in Figure 6-2.

1. Press the back of the control panel cover to release the retaining clips (see Figure 6-2).
2. Carefully lift the right end of the control panel cover and disconnect the cable from the Control Panel PCA.

Figure 6-2

Removing the Control Panel

To Reinstall:

Be careful to align the tabs at the front of the Control Panel into their alignment holes. Make sure the tabs at the back of the Control Panel are placed inside the Upper Cover before pressing into place.

NOTE

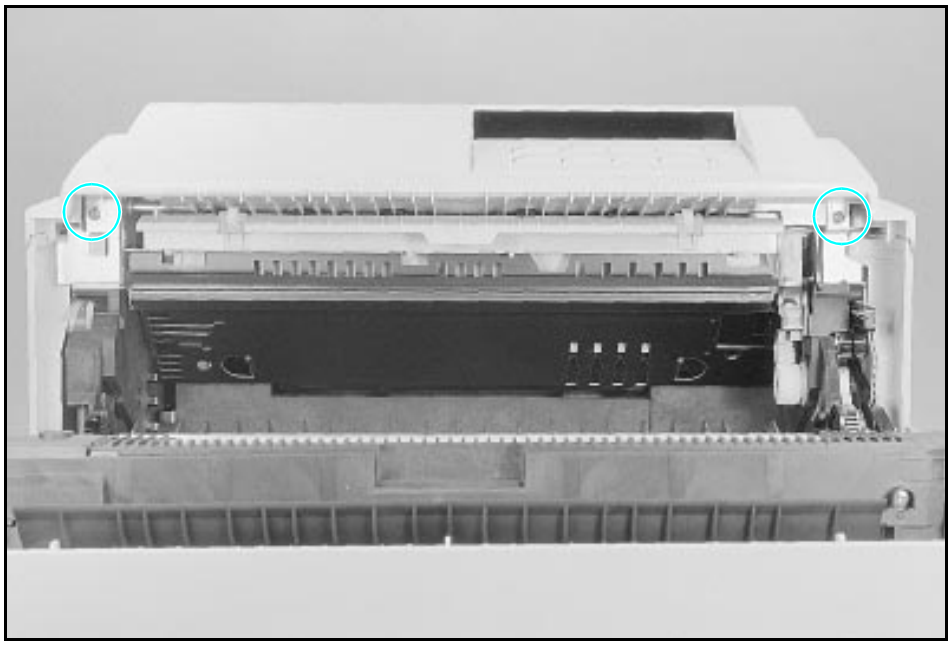
When replacing a control panel that has a non-English keyboard overlay, be sure to remove the overlay and install on the new control panel.

Upper Cover

The Upper Cover is held in place by two screws, which are accessed from the front of the printer.

1 Open the front door.
2 Remove (2) screws shown in Figure 6-3.
3 Tilt the front of the cover up, slide it to the rear, unsnap cable from retainer, and unplug the control panel connector from the Interface PCA.

Figure 6-3



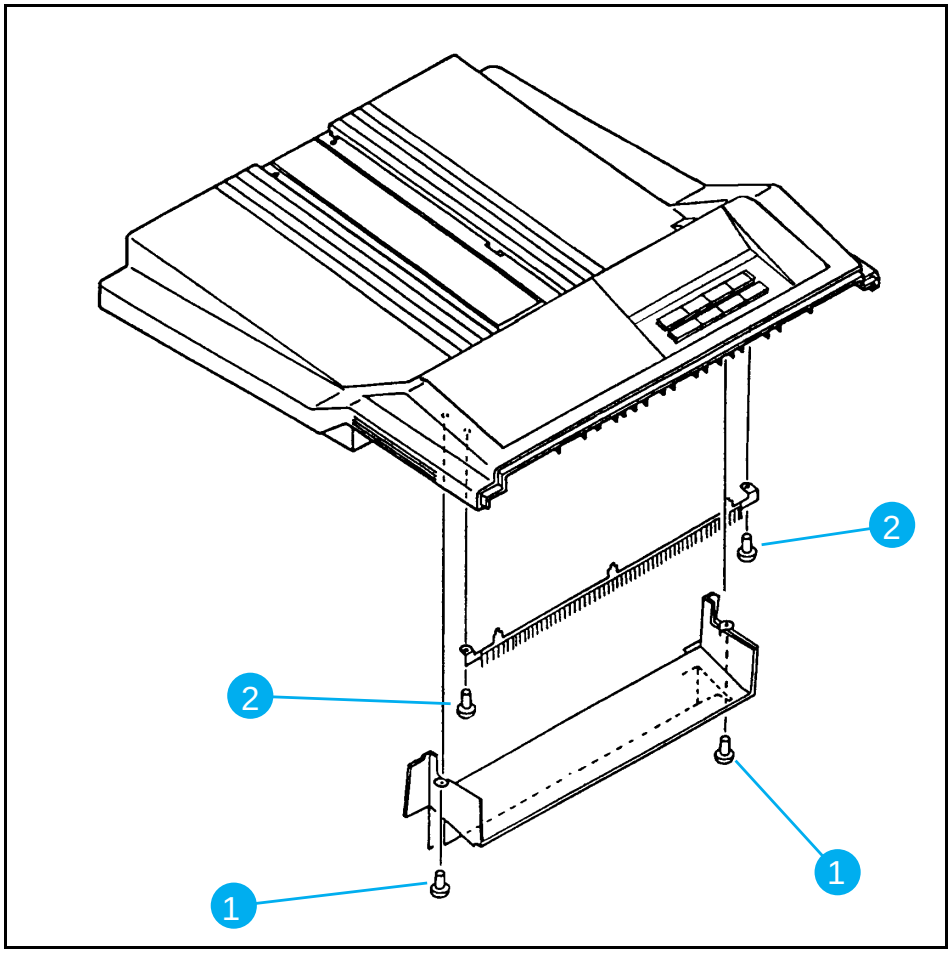
Upper Cover

Static Charge Eliminator

CAUTION Remove the Static Charge Eliminator only if replacing. Removing it may damage the accessory.

1. Remove Upper Cover (see Figure 6-3).
2. Remove delivery tray by removing (2) screws (Figure 6-4, callout 1).
3. Remove (2) screws (Figure 6-4, callout 2).
4. Using needlenose pliers, remove the Static Charge Eliminator.

Figure 6-4



Static Charge Eliminator

Side Covers

1 Remove the Upper Cover (Figure 6-3).

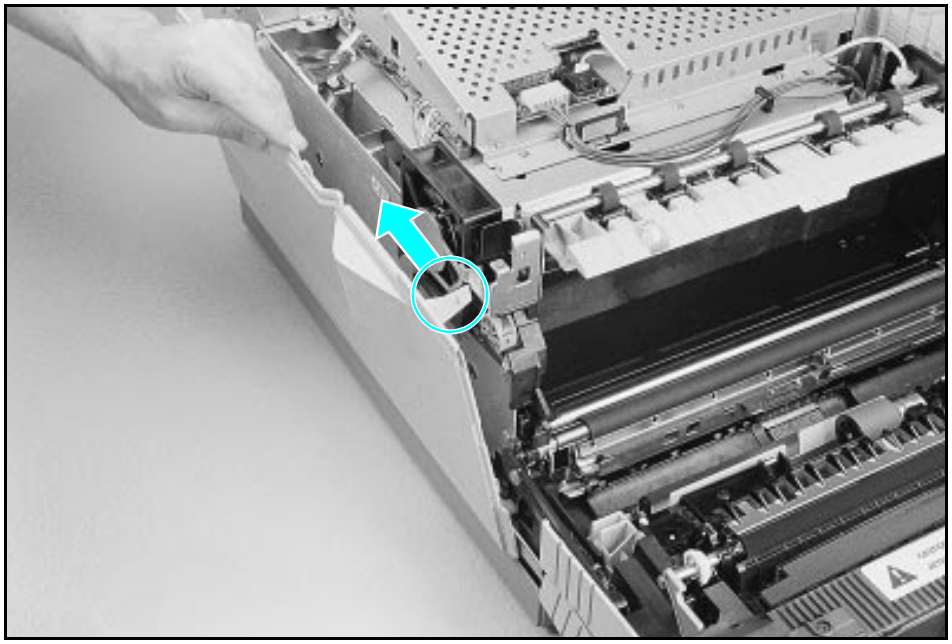
NOTE

The left cover tab (shown) presses to the rear; the right cover tab presses to the front.

2 Press on the tab to release the top edge of each side cover (Figure 6-5).

3 Tilt the cover outward and lift up.

Figure 6-5



Removing Side Covers

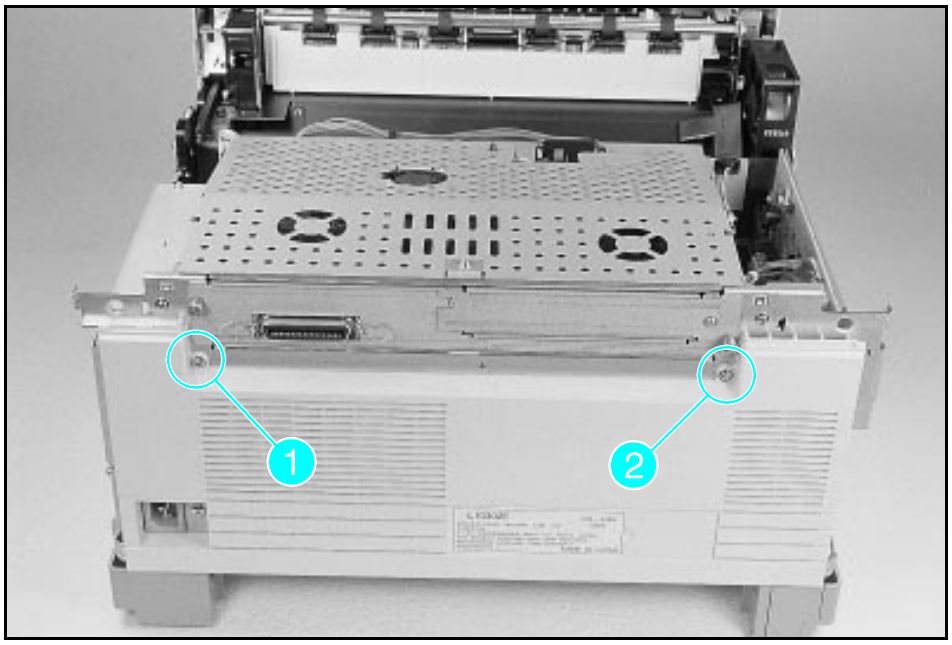
To Reinstall:

Make sure the locator tabs at the bottom of the covers are properly placed in the alignment holes in the chassis before snapping covers into place.

Rear Cover

1 Remove (1) machine screw (Figure 6-6, callout 1) and (1) shoulder screw (Figure 6-6, callout 2).
2 Tilt the cover outward and lift off.

Figure 6-6



Removing Rear Cover

To Reinstall:

Make sure the locator tabs at the bottom of the covers are properly placed in the alignment holes in the chassis before snapping covers into place.

Left Side Assemblies

Exhaust Fan (FM1)

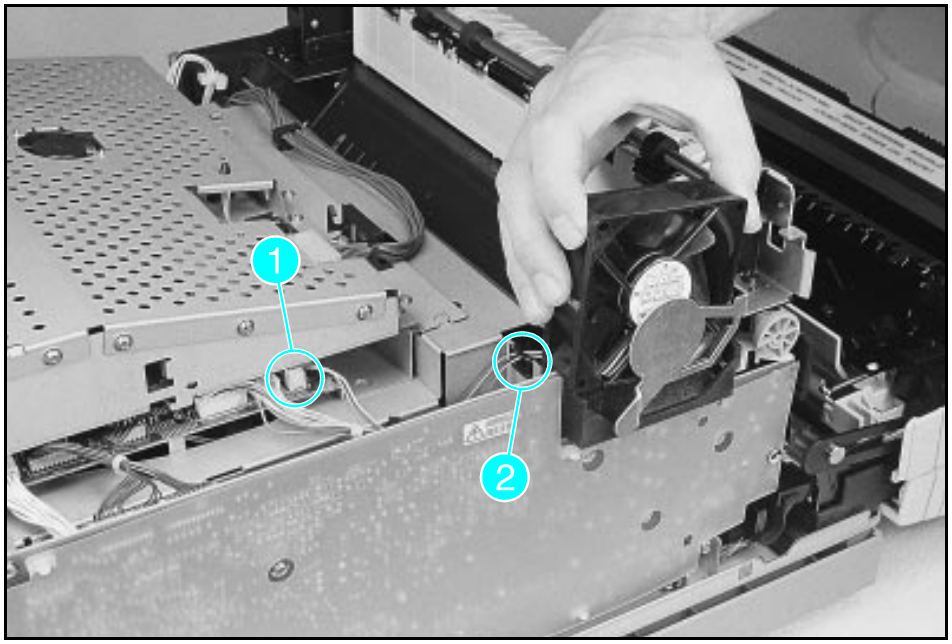
The Exhaust Fan is located on the left side of the printer, just above the High Voltage Power Supply PCA.

1 Unplug the fan connector from the DC Controller (Figure 6-7, callout 1) and remove the cable from the (2) clips (Figure 6-7, callout 2).
2 Lift the fan out of its mounting, noting the position of the cabling (attaches to lower left outside of the fan body).

NOTE

Removal of the Card Cage provides easier access to the connector on the DC Controller PCA, especially when reconnecting (Figure 6-7, callout 1).

Figure 6-7



Exhaust Fan

To Reinstall:

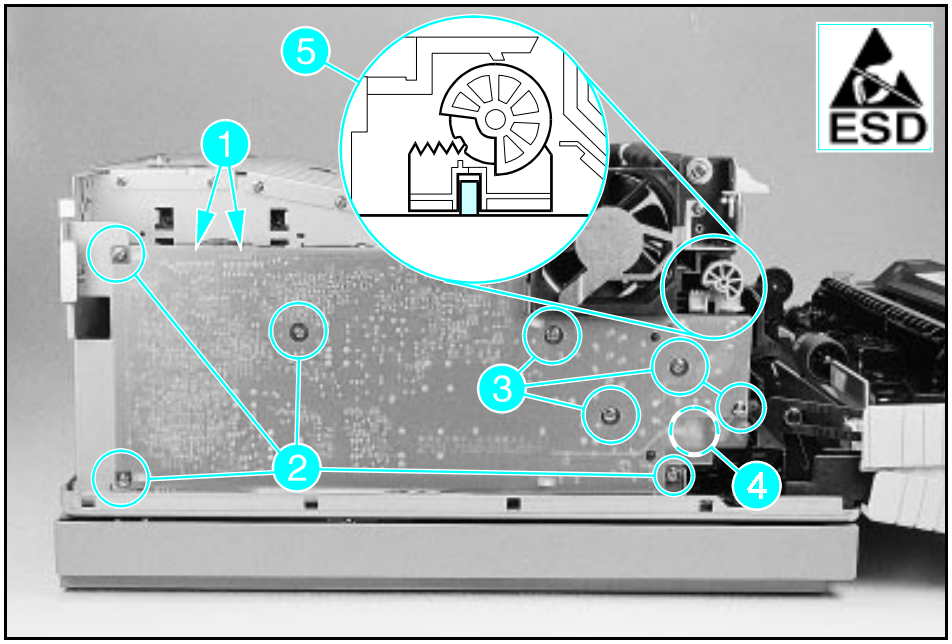
Make sure that the fan is installed in the correct direction (exhaust, not intake). The cables should be toward the outside.

High Voltage Power Supply PCA

The High Voltage Power Supply is located along the left side of the printer.

1. Remove the (2) connectors (Figure 6-8, callout 1).
2. Remove (4) machine screws (Figure 6-8, callout 2).
3. Remove (4) self-tapping screws (Figure 6-8, callout 3).
4. Bend back the plastic cover and remove (1) machine grounding screw located beneath the plastic cover (Figure 6-8, callout 4).
5. Remove the PCA.

Figure 6-8



High Voltage Power Supply PCA

To Reinstall:

Note the position of the Print Density Dial, and how it is seated in the slide adjustment as shown in Figure 6-8, callout 5.

CAUTION

If the Print Density Dial is not seated properly, the printer will not print properly.

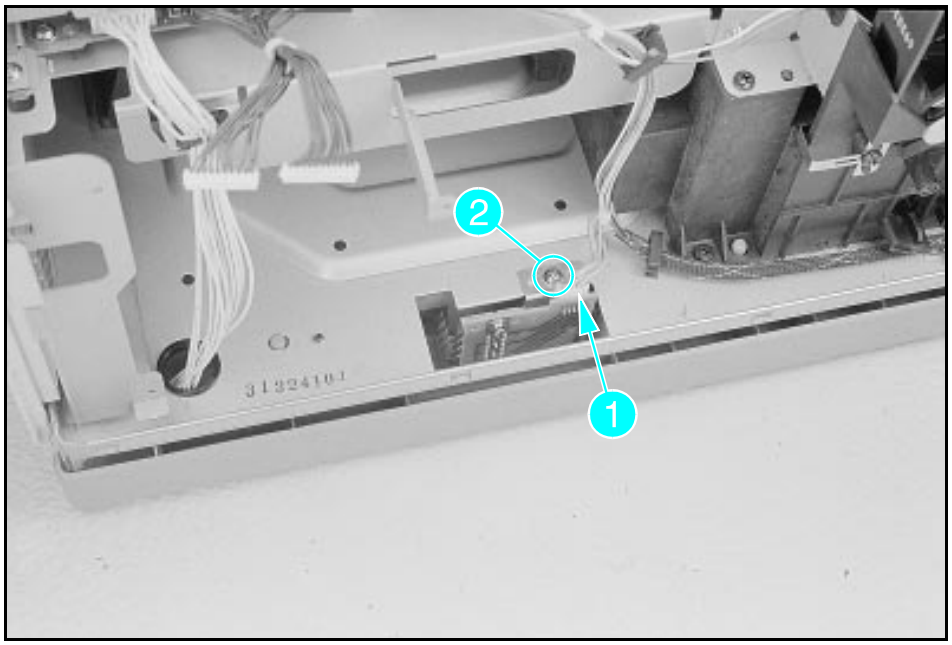
Cassette Size Sensor Assembly

1 Remove the High Voltage Power Supply PCA (see Figure 6-8).
2 Disconnect the cable (see Figure 6-9, callout 1).
3 Remove the (1) machine screw (see Figure 6-9, callout 2).

CAUTION Be careful not to damage the sensor tabs when removing the assembly.

4 Carefully lift the Cassette Size Sensor Assembly up and out of the chassis.

Figure 6-9



Cassette Size Sensor Assembly

To Reinstall:

Make sure the Cassette Size Sensor Assembly mounting bracket fits properly over the chassis locating pins when replacing the assembly.

Make sure the connector is fully inserted into its receptacle.

Rear and Top Area Assemblies

Card Cage

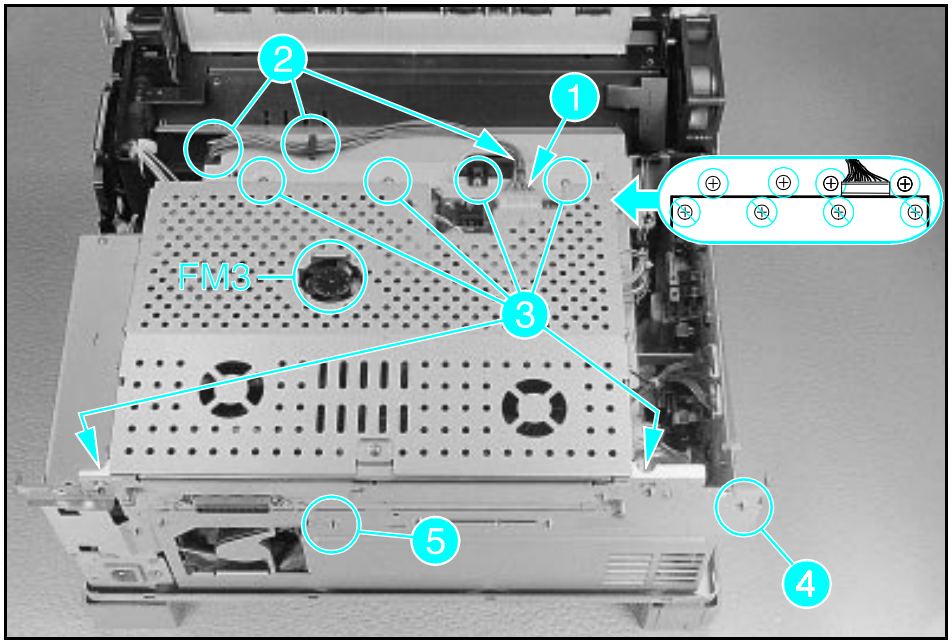
The Card Cage is located directly underneath the Upper Cover. It is not necessary to remove the Formatter or MIO from the Card Cage.

1. Disconnect the interface cable (Figure 6-10, callout 1).
2. Release the cable from the (3) cable clips (Figure 6-10, callout 2).

NOTE Do not remove (2) screws indicated in Figure 6-20 by the null symbol (⊘).

3. Remove (6) screws (four are in line with the cable clip, and two at the rear) from the top of the plate (Figure 6-10, callout 3).
4. Remove (1) screw from the back of the plate (Figure 6-10, callout 4).
5. Loosen (**do not remove**) (1) screw as shown in Figure 6-10, callout 5.
6. Lift the Card Cage off of the printer.

Figure 6-10



Card Cage

To Reinstall:

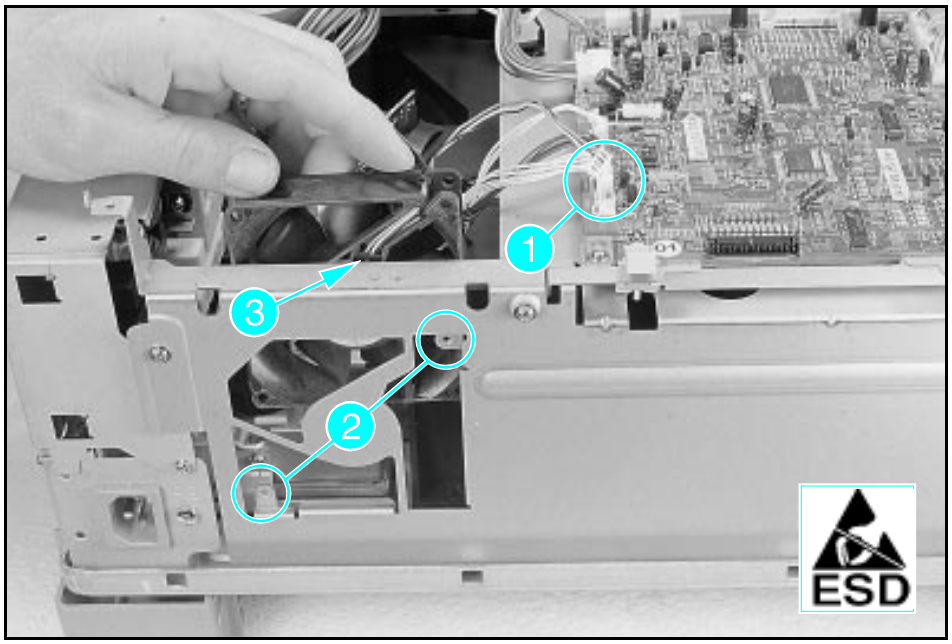
When reinstalling the Card Cage pay careful attention to the routing of the cables and the position of the cable clip shown in Figure 6-10, callout 2.

Rear Exhaust Fan (FM2)

The Rear Exhaust Fan is located on the left rear of the printer chassis, and requires prior removal of the Card Cage assembly.

1. Remove the Card Cage assembly (see Figure 6-10).
2. Unplug the fan cable connector and release it from its cable clip (Figure 6-11, callout 1).
3. Remove (2) small machine screws from the rear of the printer (Figure 6-11, callout 2).
4. Lift the fan up and away from the printer chassis, noting position of the cable on the upper right corner of the fan body (Figure 6-11, callout 3).

Figure 6-11



Rear Exhaust Fan

To Reinstall:

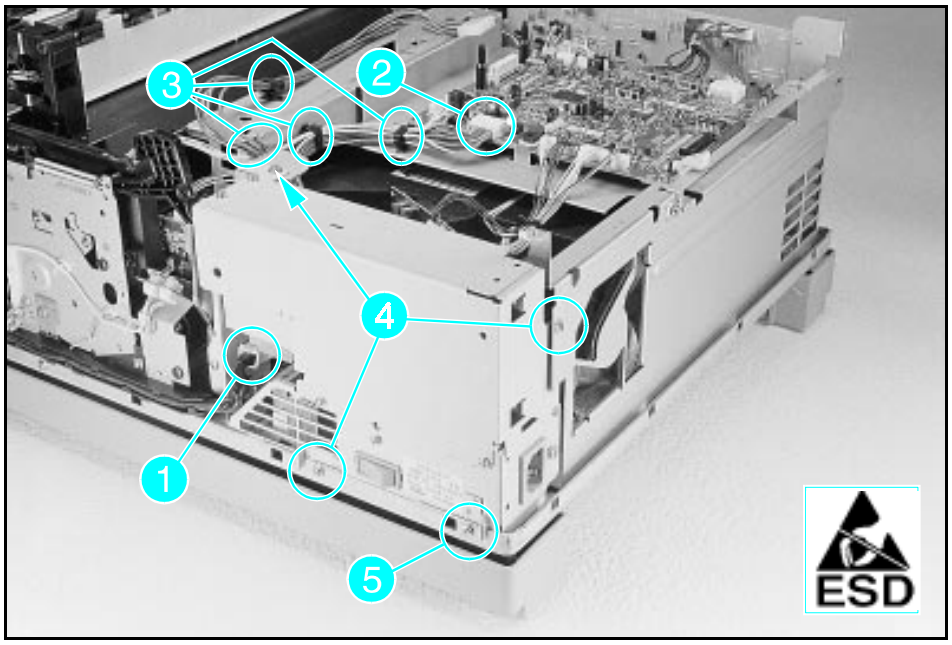
Make sure the fan body is seated to the rear of the chassis mounting tabs.

Power Supply Unit

The front door must be opened prior to removing the Power Supply Unit.

1. Remove the Card Cage assembly (see Figure 6-10).
2. Unplug the connector from the Fusing assembly (Figure 6-12, callout 1).
3. Unplug the connector from the DC Controller PCA (Figure 6-12, callout 2).
4. Remove the cables from the (4) cable clips (Figure 6-12, callout 3) and remove the DC Controller and Formatter power cables.
5. Remove (3) machine screws (Figure 6-12, callout 4).
6. Remove (1) machine grounding screw with star washer (Figure 6-12, callout 5).
7. Lift the assembly up to clear the chassis and pull sideways out of the printer.

Figure 6-12



Power Supply Unit

DC Controller PCA

The DC Controller PCA is located directly beneath the Card Cage assembly.

1 Remove the Card Cage assembly (see Figure 6-10).

CAUTION

(4) connectors are hardwired to the DC Controller and must be unplugged at the other end of the wires.

2 Unplug (2) connectors from the top edge of the High Voltage Power Supply PCA (Figure 6-13, callout 1).

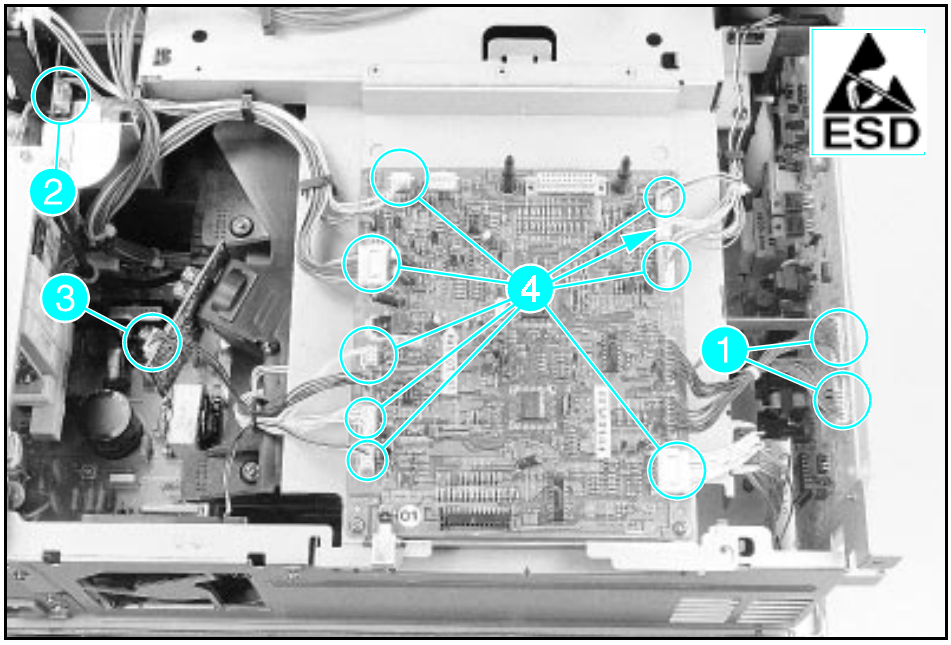
3 Unplug (1) connector from the top of the main motor and release the cable from the (3) clips (Figure 6-13, callout 2).

4 Unplug (1) connector from the side of the Laser Scanner PCA and release it from its clip (Figure 6-13, callout 3).

5 Unplug (9) connectors from the PCA (Figure 6-13, callout 4).

6 The DC Controller is now free. Slide it toward the back of the printer and lift out.

Figure 6-13



DC Controller PCA

Laser/Scanner Assembly

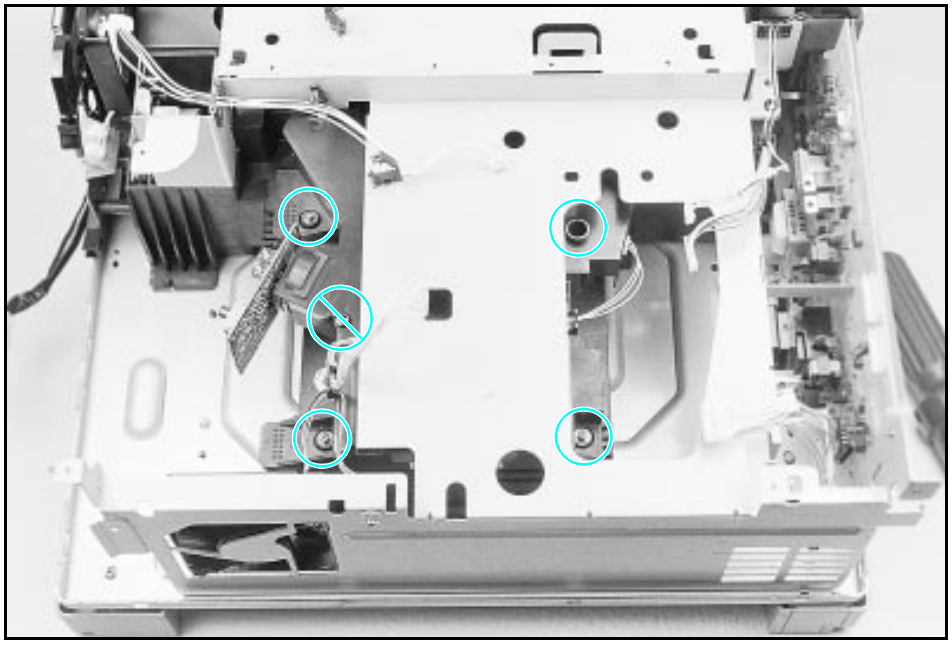
The Laser/Scanner assembly is located under the DC Controller PCA.

1 Remove the following components:
- Card Cage assembly (Figure 6-10)
- Rear Exhaust Fan (FM2) (Figure 6-11)
- Power Supply Unit (Figure 6-12)
- DC Controller PCA (Figure 6-13)

2 Remove (4) long, machine screws (Figure 6-14).

3 Lift up slightly to disengage from alignment pins and carefully slide the Laser/Scanner assembly out the side of the printer chassis.

Figure 6-14



Laser/Scanner Assembly

To Reinstall:

Make sure that assembly engages alignment pins.

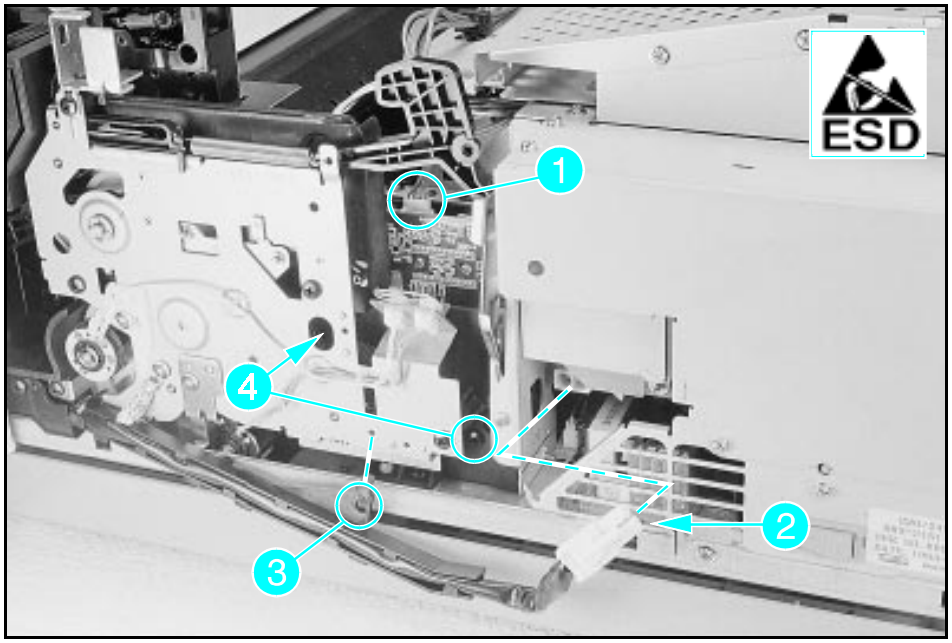
Right Side Assemblies

Main Motor (M1)

The Main Motor is located adjacent to the Power Supply Unit. Other than the covers, the Main Motor assembly does not require removal of any other assemblies.

1. Unplug the cable connector from the top of the Main Motor (Figure 6-15, callout 1).
2. Disconnect the Fuser cable from the Power Supply Unit (Figure 6-15, callout 2).
3. Remove (1) machine screw securing the right end of the cable tray, and drop the cable tray downward out of the way (Figure 6-15, callout 3).
4. Remove (2) large diameter, machine screws (Figure 6-15, callout 4).
5. The Main Motor is now free. Lift it up and out of the printer, being careful to clear any cables.

Figure 6-15



Main Motor

To Reinstall:

Make sure that the shaft meshes properly with the gear.

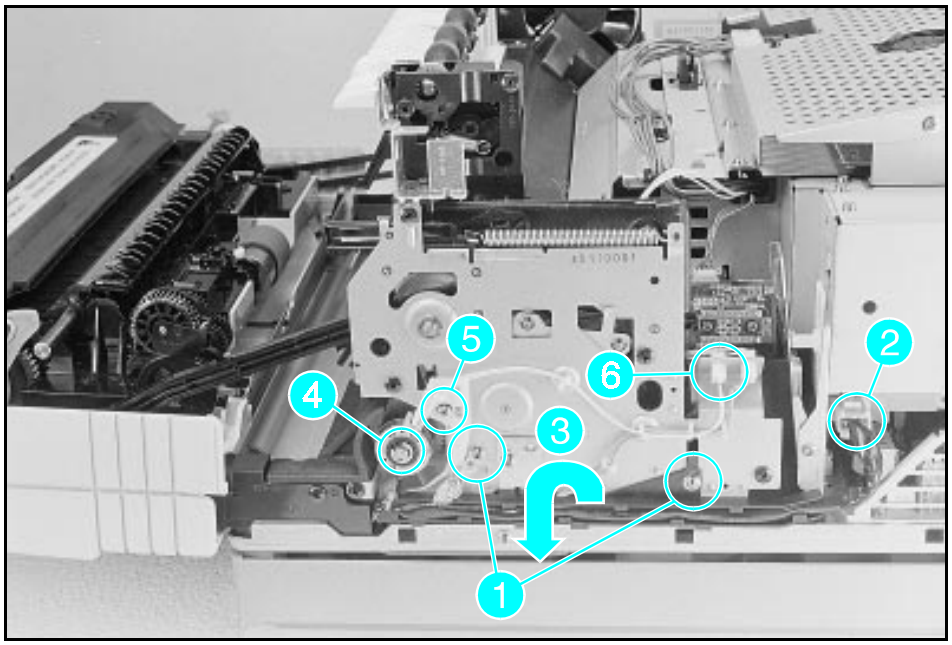
Leave screws loose until both are started, then tighten.

Main Drive Assembly

The Main Drive assembly is located on the right side of the printer toward the front.

1. Remove (2) machine screws (Figure 6-16, callout 1).
2. Unplug the Fuser connector from the Power Supply Unit (Figure 6-16, callout 2).
3. Lift out plastic cable shield and pull the cable tray out of the way (Figure 6-16, callout 3).
4. Carefully remove the e-clip from the registration clutch shaft (Figure 6-16, callout 4).
5. Remove (1) screw from the registration clutch alignment guide and remove the guide (Figure 6-16, callout 5).
6. Unplug the registration clutch connector (Figure 6-16, callout 6).
7. Slide the registration clutch off the shaft and free its cable from the cable clips.

Figure 6-16



Main Drive Assembly Removal (1 of 2)

(continued on next page)

8 Remove (2) screws from the pickup clutch alignment guide (metal) and remove the guide (Figure 6-17, callout 7).

9 Unplug the pickup clutch connector and remove its cable from the clips (Figure 6-17, callout 8).

10 Carefully remove the e-clip, washers and bushing from the shaft (Figure 6-17, callout 9).

11 Unplug the upper end of the two connectors on the Main Drive assembly (Figure 6-17, callout 10).

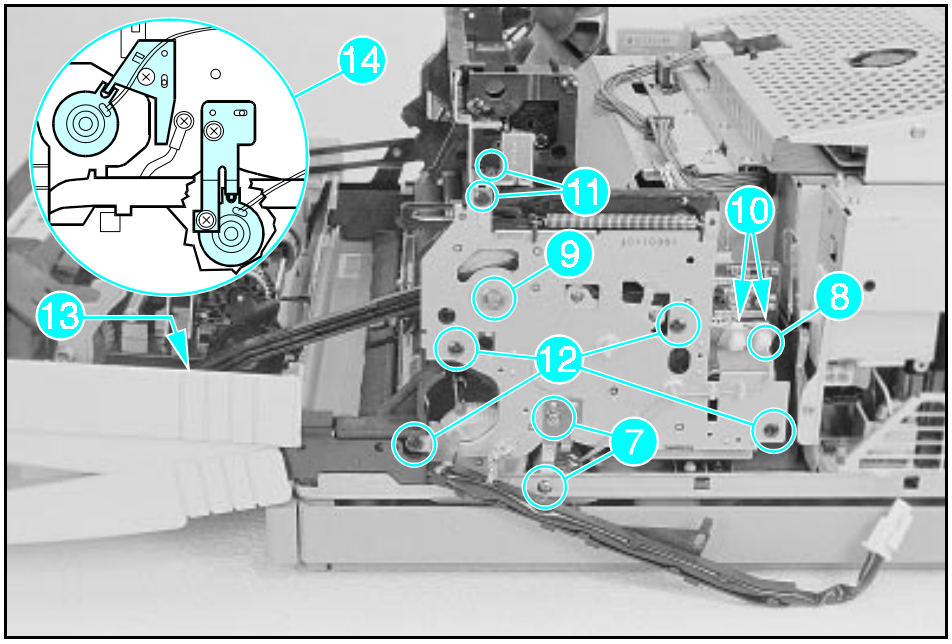
12 Remove (2) self-tapping screws securing the Upper Cover mounting bracket and remove the bracket (Figure 6-17, callout 11).

13 Remove (4) self-tapping screws (Figure 6-17, callout 12).

14 While supporting the weight of the front door, release the Front Door retainer arm by pushing out on the retainer arm clamp (Figure 6-17, callout 13).

15 The Main Drive assembly is now free. Slide it outward from the printer.

Figure 6-17



Main Drive Assembly Removal (2 of 2)

To Reinstall:

When reinstalling the Main Drive assembly be certain to align the alignment tabs with the notch on both the registration roller clutch and the pickup roller clutch (Figure 6-17, callout 14).

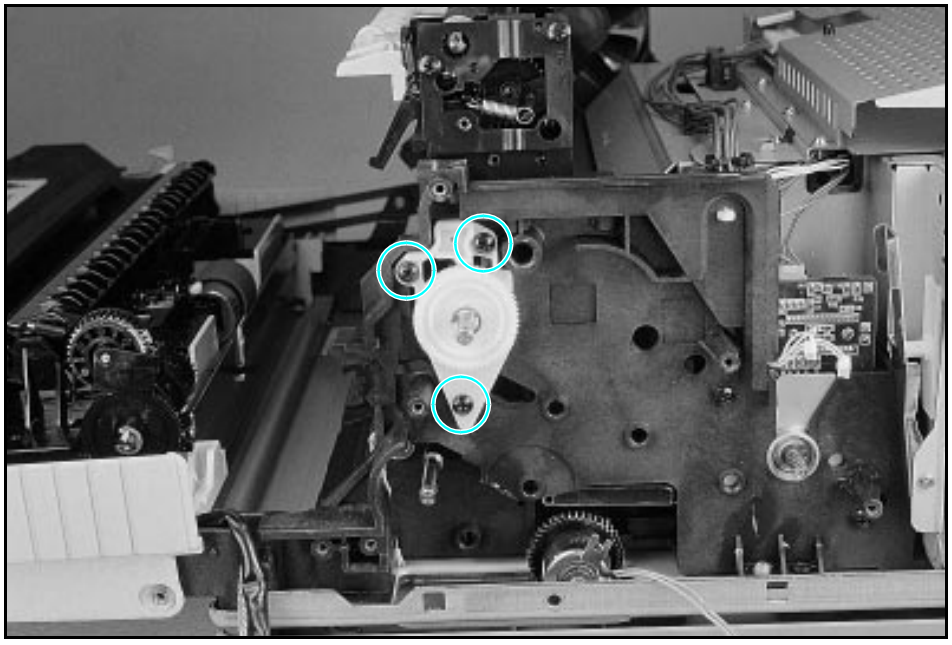
NOTE The smaller diameter e-clip fits on the registration clutch.

Drum Drive Assembly

The Drum Drive assembly is located directly behind the Main Drive assembly.

1. Remove the toner cartridge.
2. Remove the Main Drive assembly (see Figure 6-16).
3. Remove (3) self-tapping screws (Figure 6-18).
4. Slide the assembly out of the printer.

Figure 6-18



Drum Drive Assembly

Front Door Assemblies

All Front Door assemblies can be removed without prior removal of any covers or other components.

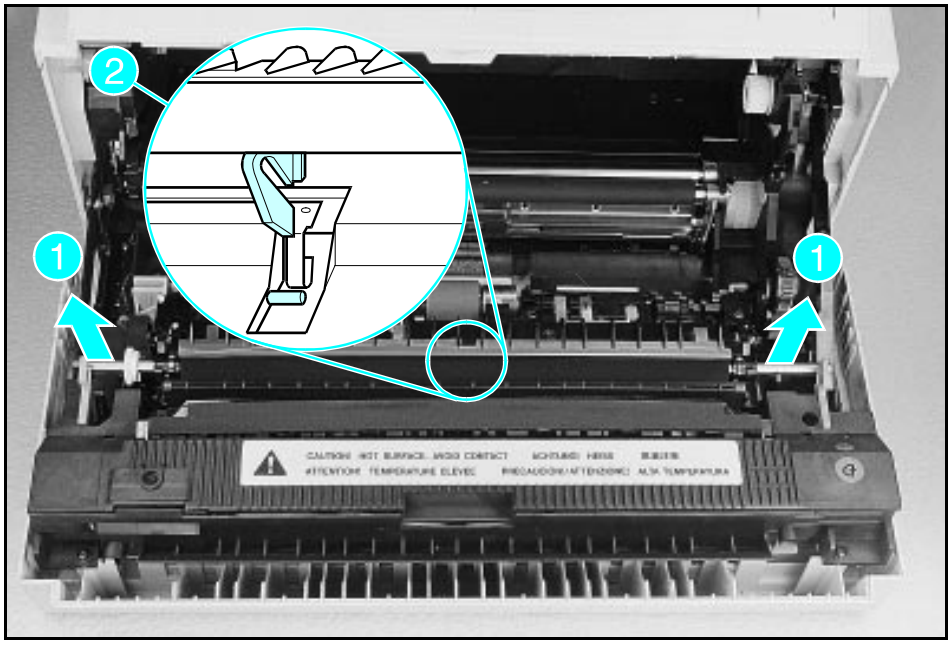
Transfer Roller Assembly

CAUTION

Handle the Transfer Roller from the ends only. Do not touch the surface of the Transfer Roller. Skin oils will affect its electrical characteristics, resulting in poor image transfer.

1 Grasp the shaft on either end of the Transfer Roller and lift upward to snap out of the plastic retainer clip (Figure 6-19, callout 1).
2 Lift the opposite end up and out of its retainer clip.

Figure 6-19



Transfer Roller Assembly

To Reinstall:

Be sure that the non-gear end of the shaft is to the right.

Also make sure that the alignment slot (plastic tab) on the underneath side of the Transfer Roller slips over the locator pin (Figure 6-19, callout 2).

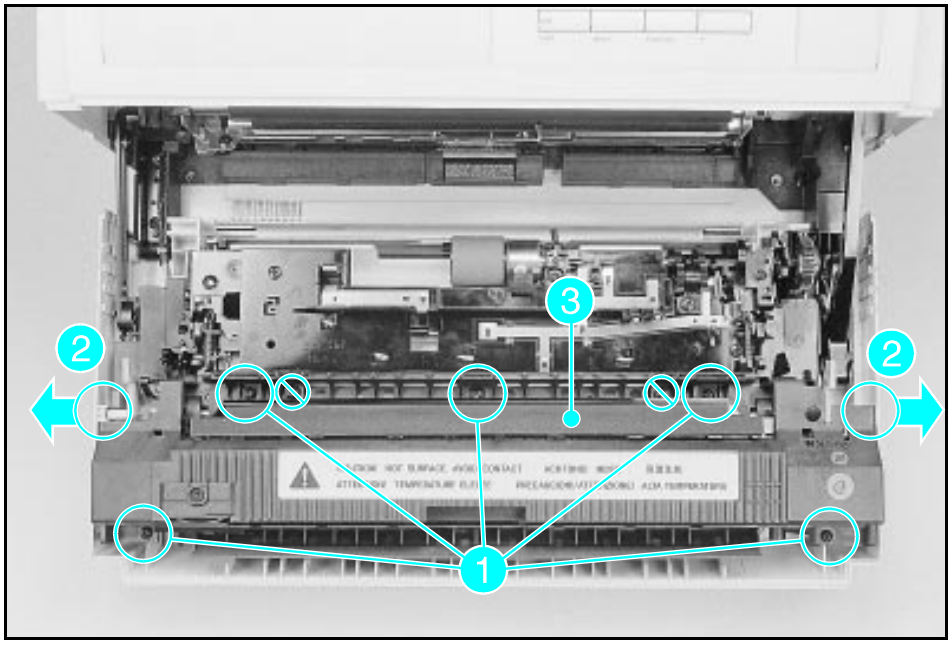
Fusing Assembly

The Fusing assembly is located on the upper portion of the printer door.

CAUTION Do not remove (2) screws indicated in (Figure 6-20) by the null symbol (⊘).

1. Remove the Transfer Roller (see Figure 6-19).
2. Remove (5) machine shoulder screws (Figure 6-20, callout 1).
3. Pull outward on the edges of the Front Door assembly to release the shaft (Figure 6-20, callout 2).
4. Lift the Fusing assembly up and out.

Figure 6-20



Fusing Assembly

To Reinstall:

CAUTION Make sure that the Protection Plate (Figure 6-20, callout 3) is in place or damage to the toner cartridge drum will occur.

Fuser Inlet Guide

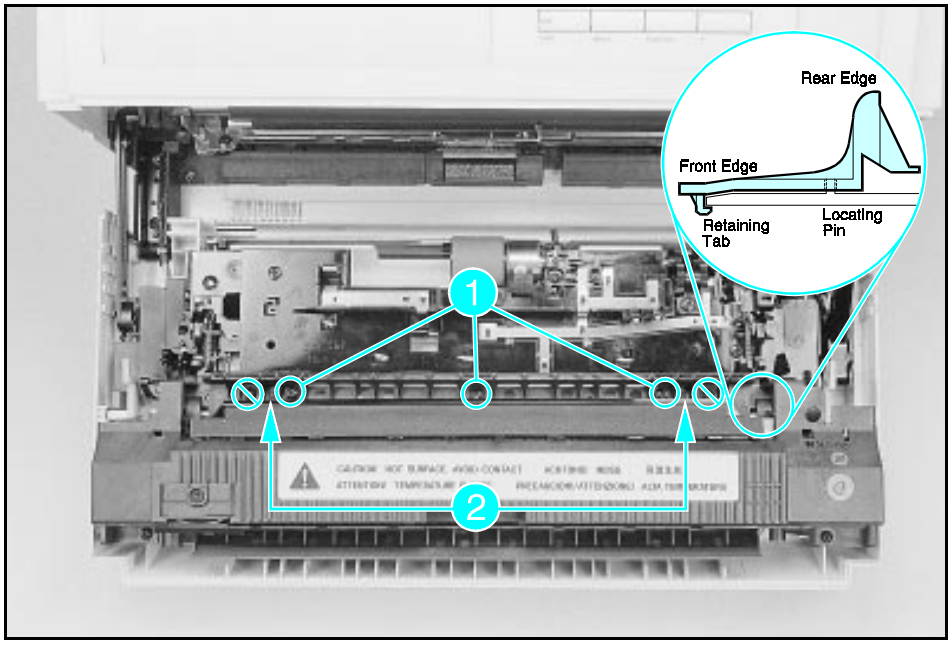
WARNING The Fuser Inlet Guide contains the anti-static teeth. They are VERY sharp.

The Fuser Inlet Guide is located inside the Front Door assembly just forward of the Transfer Roller.

NOTE Do not remove (2) screws indicated in (Figure 6-21) by the null symbol (⊘).

1 Remove the Transfer Roller (See Figure 6-19).
2 Remove (3) screws (washers on two end screws only) (Figure 6-21, callout 1).
3 Lift the rear edge of the guide to clear locating pins (Figure 6-21, callout 2). Push to the front while tilting the front edge upward to clear retaining tabs.

Figure 6-21



Fuser Inlet Guide

To Reinstall:

1 To determine initial placement, align the guide over the locating pins but do not snap them into place.
2 While tilting the front edge downward to engage the retaining tabs, push the guide to the rear and downward to snap over the locating pins.

CAUTION The (2) washers must be in place (one on each outer screw) and the guide seated, with retaining tabs located correctly, or paper jams will occur.

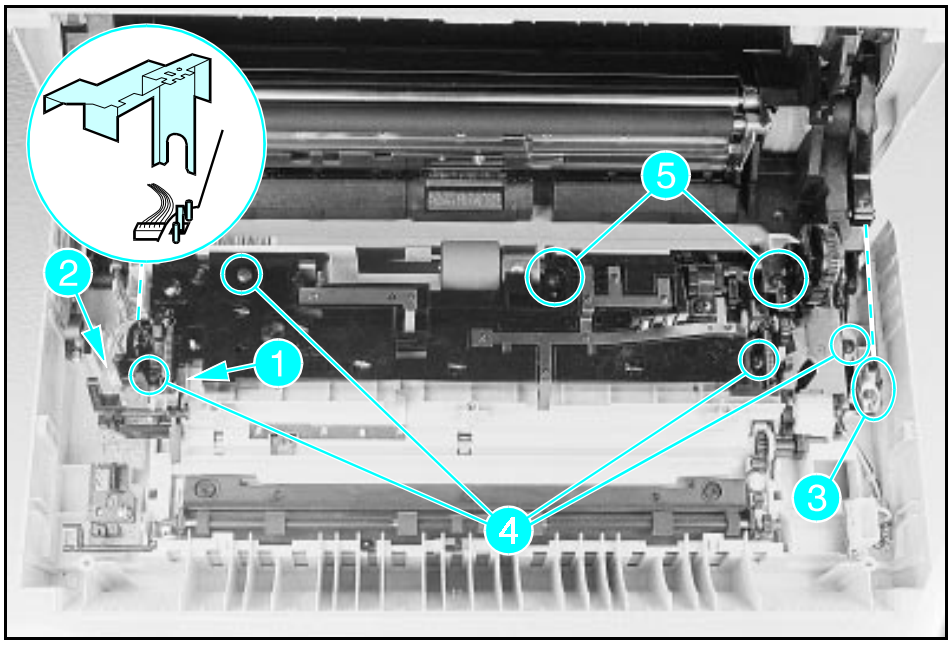
3 Replace the (3) screws, ensuring that the (2) spring washers are in place.

Paper Guide Plate Assembly

The Paper Guide Plate assembly contains the MP Tray pickup roller, motor, and gear assemblies, and requires prior removal of the Transfer Roller and Fusing assembly.

1. Remove the Transfer Roller (see Figure 6-19).
2. Remove the Fusing assembly, (see Figure 6-20).
3. Carefully remove the small spring attached to the sensor assembly shown in Figure 6-22, callout 1.
4. From the left side of the assembly push on the retainer tab and lift off the plastic cable shield (already removed in Figure 6-22).
5. Unplug (1) connector shown in Figure 6-22, callout 2.
6. Release the right door retainer arm by pushing out on the retainer arm clamp (Figure 6-22, callout 3).
7. Remove (4) self-tapping screws (Figure 6-22, callout 4).
8. Remove (2) long, machine screws (Figure 6-22, callout 5).
9. The Paper Guide Plate assembly is now free. Lift it upward and out of the printer.

Figure 6-22



Paper Guide Plate Assembly

To Reinstall:

Align the two plastic alignment pins and pull the tension off the MP Guide Plate assembly while lowering. Note that the assembly must be pressed downward against the grounding springs before it is fully seated. Be sure the sensor assembly spring is put back in place (Figure 6-22, callout 1).

MP Guide Plate

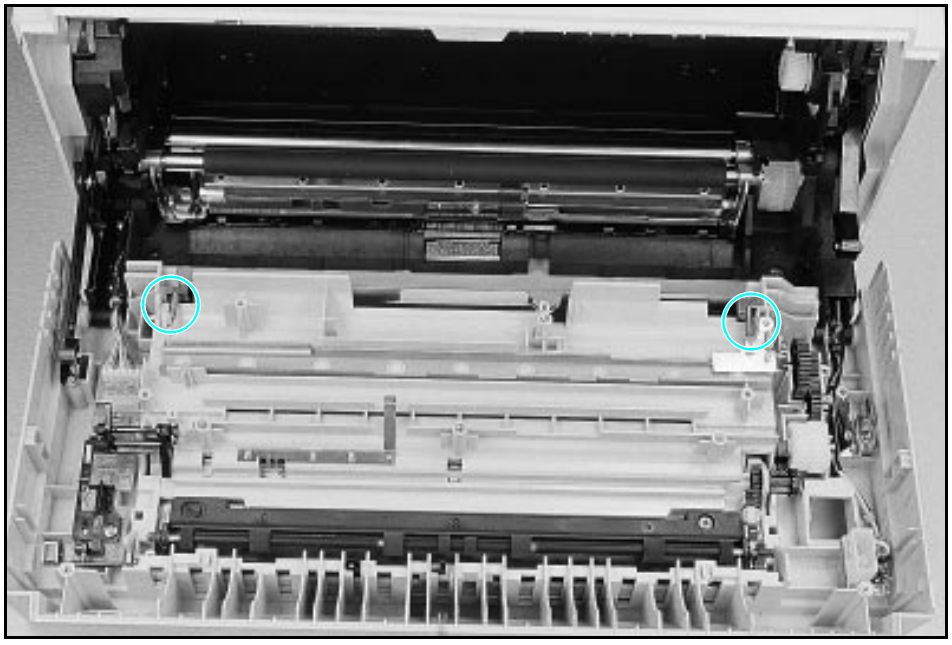
The MP Guide plate is located adjacent to the MP Pickup Roller assembly and requires prior removal of the Paper Guide Plate assembly.

CAUTION

The springs on each end of the plate are under tension. Be careful when releasing.

1. Using needle-nosed pliers, carefully release the tension on (2) springs (Figure 6-23).
2. Snap the left and right hinge retainers off the shafts on the bottom of the assembly. Lift the MP Guide plate assembly up and out.

Figure 6-23



MP Guide Plate

MP Drive Gears

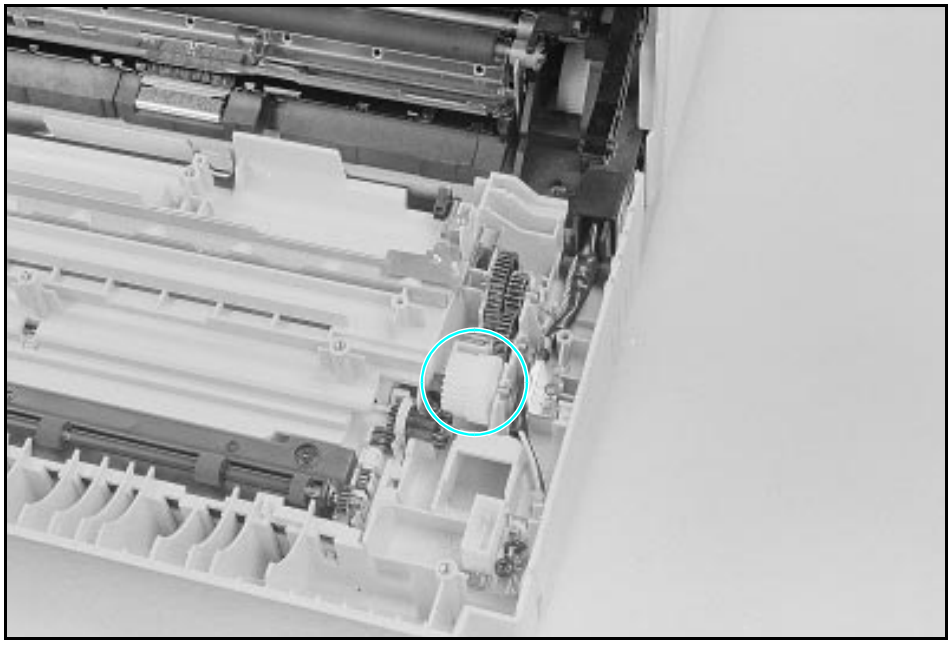
The MP Tray Drive Gears are housed within the Front Door assembly directly under the Paper Guide Plate assembly.

NOTE

The Drive Gear that is circled in Figure 6-24 requires prior removal of the Fuser Door (see Figure 6-25, callout 2).

1 Remove the Fusing Assembly and the Paper Guide Plate assembly (see Figures 6-20 and 6-22).
2 The gears are now free (except large gear— see note above).

Figure 6-24



MP Drive Gears

To Reinstall:

Pay close attention to the shaft locations and diameters when reinstalling the gears.

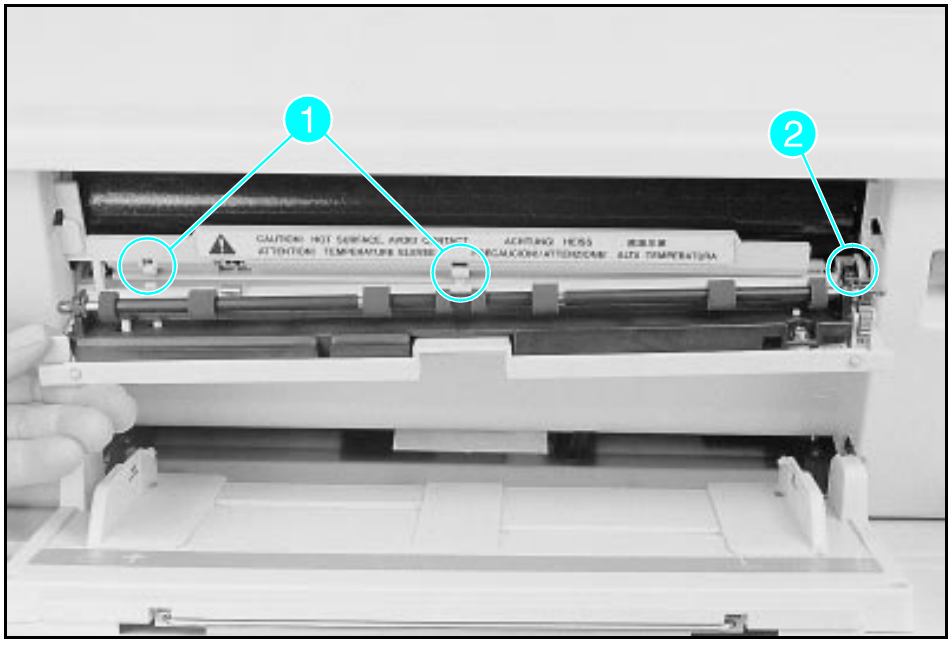
Fuser Door

The Fuser Door is accessed with the printer front door closed and the MP Tray open.

1 Open the Fuser Door part way and press downward on the left end to release (2) plastic retainer clips from the pins (see Figure 6-25, callout 1).

2 Rotate upward to nearly closed, then slide the door assembly outward and to the left to clear the gear on the right end (Figure 6-25, callout 2).

Figure 6-25



Fuser Door

To Reinstall:

When reinstalling, align the ring on the right end with the gear before tilting the door into place (Figure 6-25, callout 2).

MP Tray

To remove the MP Tray the printer front door must be closed and the MP Tray open.

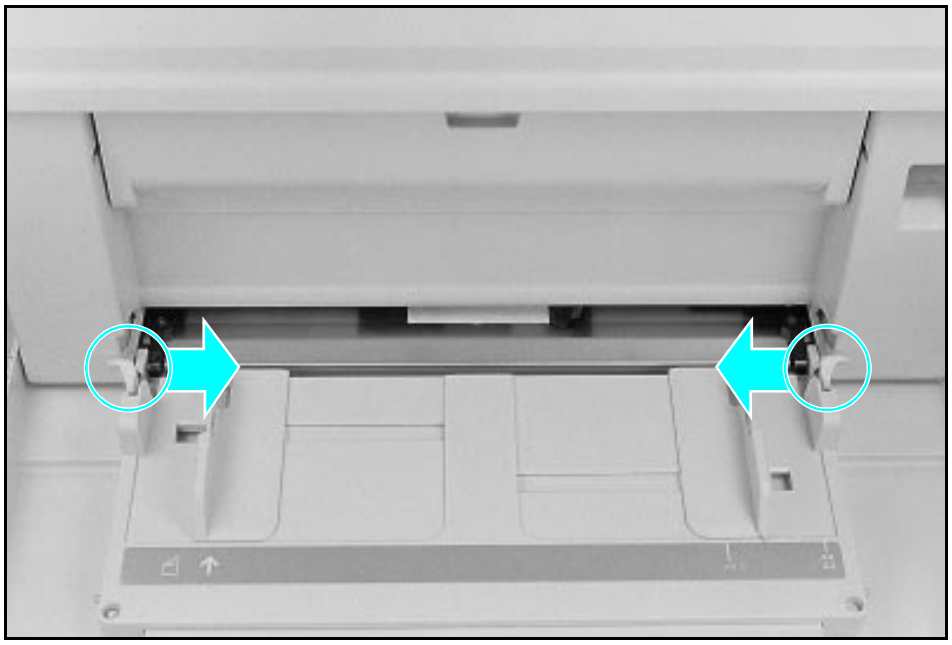
1 Grasp right and left edges of the MP Tray and squeeze inward to release retainer arms.

NOTE

The plastic retainer arms are designed to pop out when snapped downward. This requires a quick, firm snapping action to free the MP Tray.

2 Slide tray outward off the hinge pins (see Figure 6-26).

Figure 6-26



MP Tray

To Reinstall:

Slide the hinge tabs over the plastic hinge pins and squeeze the retainer clips inward forcefully while lifting the door upward to close.

Front Door Assembly

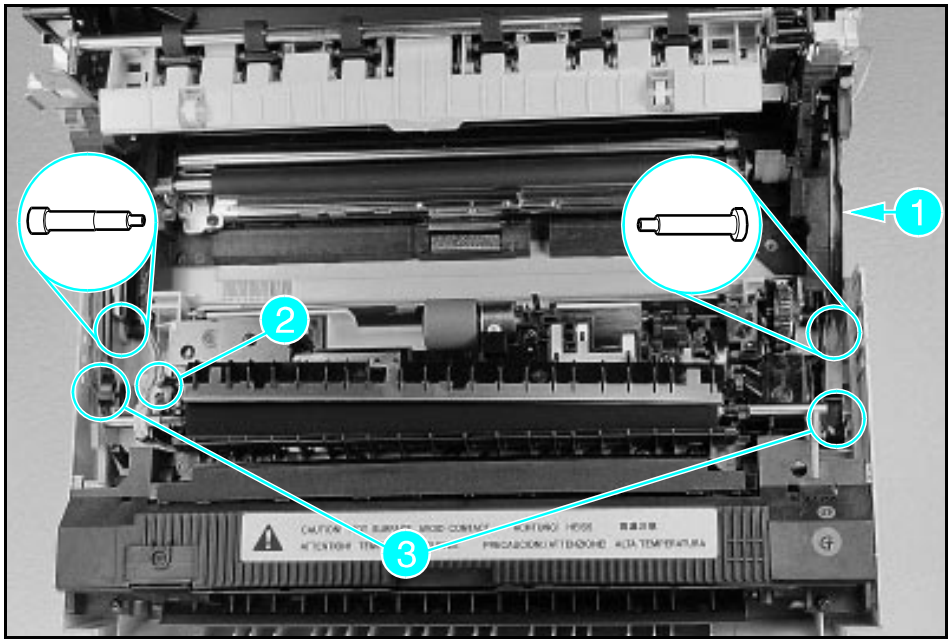
The Front Door assembly is removed as a single assembly and requires prior removal of the printer covers and the MP Tray.

1 Remove the MP Tray (see Figure 6-26).
2 Remove (1) screw (Figure 6-27, callout 1) and remove Fuser Cable tray cover.
3 Unplug the Fuser Cable (on the right side of the printer) and remove (2) screws to release the cable tray from the printer chassis (see Figure 6-16, callout 1).
4 Remove the plastic cable shield (already off in photo) and unplug the rearmost connector on the left side (Figure 6-27, callout 2).
5 Gently pry outward on the clips to release the right and left Front Door retainer arms (Figure 6-27, callout 3).

CAUTION The door assembly is heavy. Use caution when removing the hinge pins.

6 Using needle nose pliers, pull the hinge pins outward while supporting the weight of the Front Door assembly.

Figure 6-27



Front Door Assembly

To Reinstall:

Note that the hinge pins on the Front Door assembly are different. The right side hinge pin is transparent in color and has a larger diameter head. The hinge pin for the left side is opaque and has a smaller diameter head.

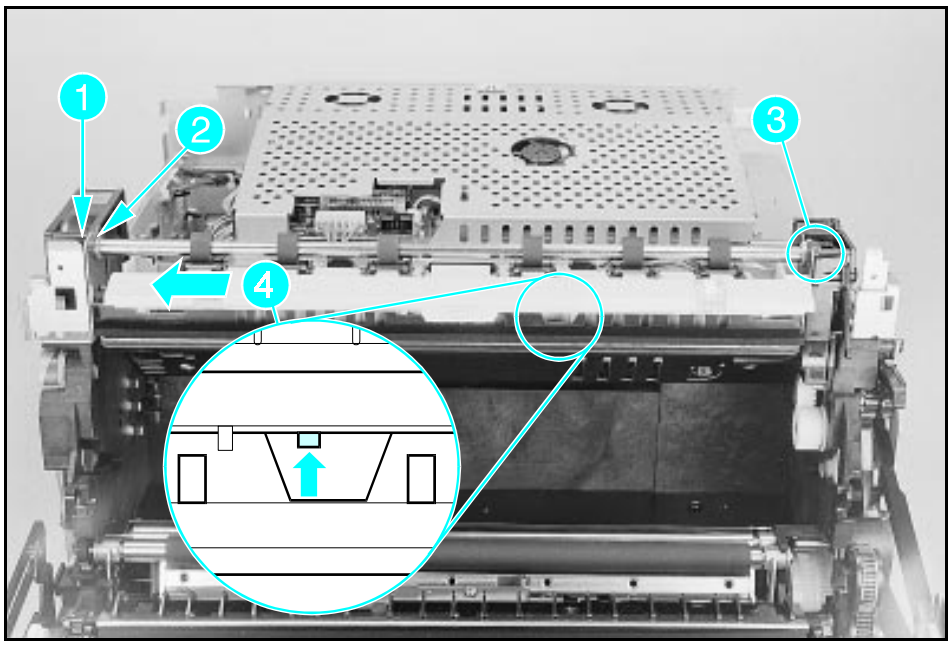
Delivery Area Assemblies

Upper and Lower Delivery Roller Assemblies

The Delivery Roller assemblies are located on top of the printer chassis and require removal of the Upper Cover to access.

1. Remove the e-clip on the left end of the upper roller shaft (Figure 6-28, callout 1).
2. Slide the bushing toward the left to clear the bracket (Figure 6-28, callout 2).
3. Lift the left end of the roller shaft upward slightly and slide the right bushing to the right out of its retainer (Figure 6-28, callout 3).
4. Lift the left end of the shaft the rest of the way up and out to clear the gear on the right end.
5. Push upward on small retainer tab located under the plate assembly (Figure 6-28, callout 4) and slide the assembly to the left to clear its alignment tabs.

Figure 6-28



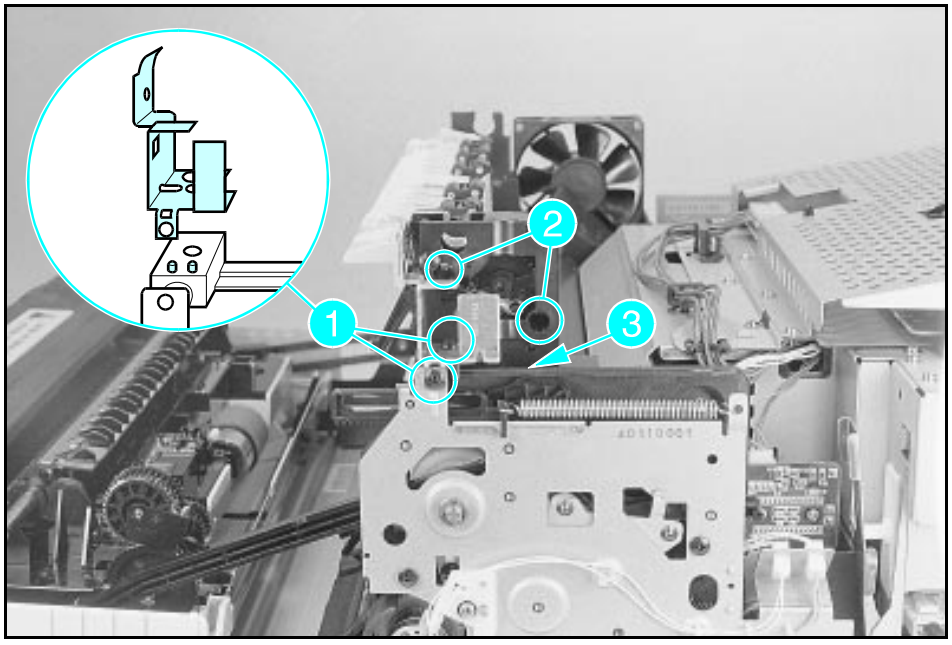
Upper and Lower Delivery Roller Assemblies

Delivery Gear Assembly

The Delivery Gear assembly is located adjacent to the Upper Delivery Rollers on the top right end of the printer, and requires previous removal of the Upper Delivery Roller.

1. Remove the Upper Delivery Roller (Figure 6-28).
2. Remove (2) self-tapping screws securing the Upper Cover support bracket (Figure 6-29, callout 1).
3. Remove (2) machine screws (Figure 6-29, callout 2).
4. Remove (1) self-tapping screw securing the foot of the output roller gears to the printer chassis (Figure 6-29, callout 3).
5. Pull the gear body outward to clear the retainer tab and alignment pins and lift it up and out of the printer.

Figure 6-29



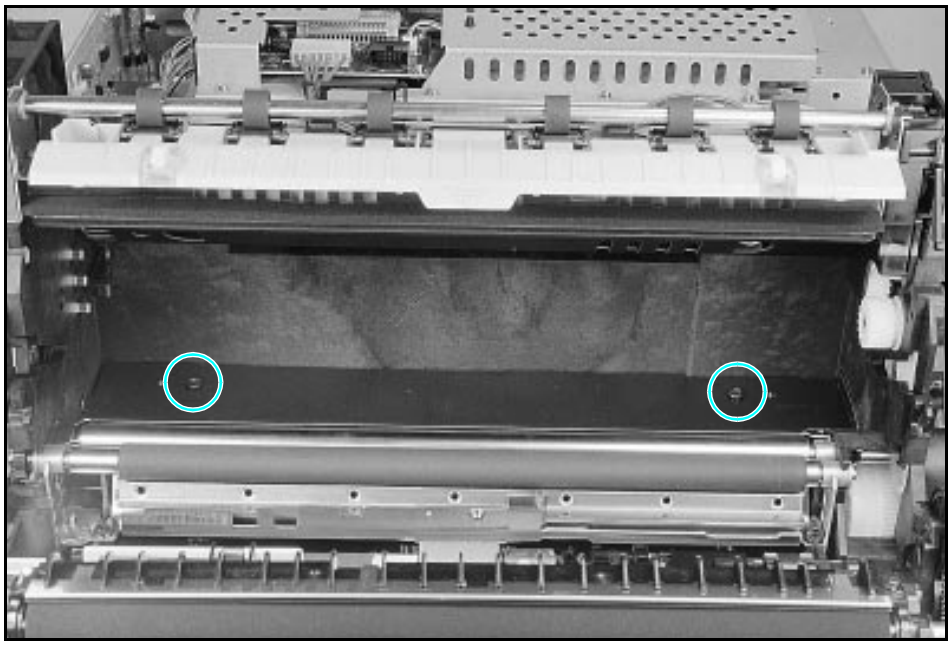
Delivery Gear Assembly

Cartridge Guide

The Cartridge Guide is located directly under the toner cartridge and behind the Registration Rollers. Note that the removal of this guide does not require prior removal of the Upper Cover or any upper area assemblies.

1. Using a stubby Phillips screwdriver, remove the two self-tapping screws (Figure 6-30).
2. Lift the front edge of the plate upward and slide it forward, out of the printer. Note that the plate fits tightly within the opening.

Figure 6-30



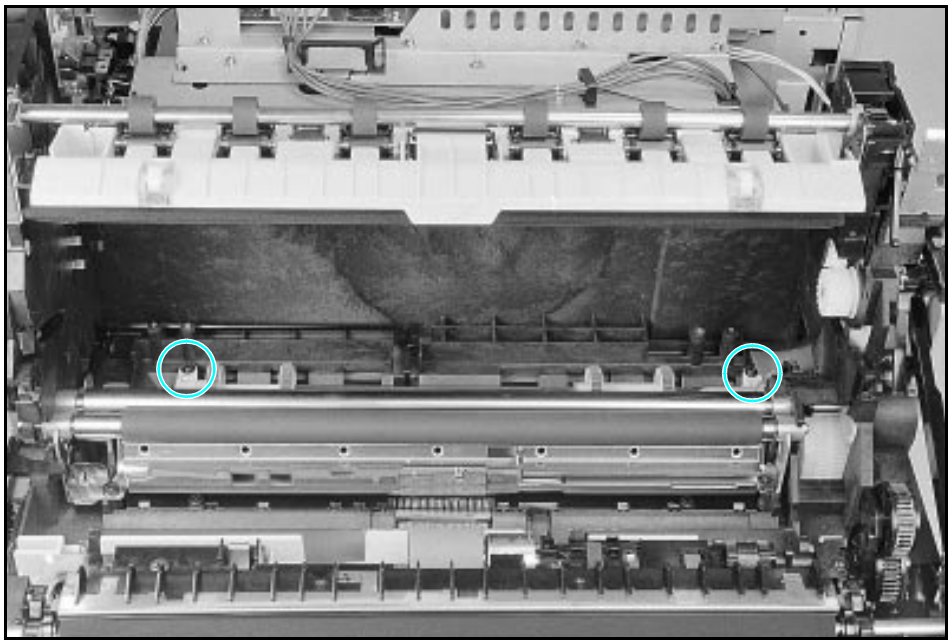
Cartridge Guide

Cassette Pickup Roller Assembly

The Cassette Pickup Roller assembly is located under the Cartridge Guide. The removal of this assembly requires prior removal of the top and right side covers and will require a stubby Phillips screwdriver.

1 Remove Paper Cassette and Cartridge Guide (Figure 6-30).
2 From the right side of the printer, remove the pickup clutch alignment guide (Figure 6-17, callouts 7 & 8). Unplug and free the clutch cable.
3 Remove (2) small diameter, machine screws (Figure 6-31).
4 Tilt the roller shaft upward from the left end and lift out, being careful not to damage the cable.

Figure 6-31



Cassette Pickup Roller Assembly

To Reinstall:

1 Thread the Pickup Roller Clutch Cable underneath the MP Drive Gears on the right end while sliding the shaft into position.

CAUTION

The next step is very important. If the clutch is not aligned properly, paper will not feed.

2 Align the tab on the pickup clutch alignment guide as shown previously in Figure 6-17, callout 14.
3 Align the plastic bearing retainers on each end of the shaft so the flat portion is facing upward in proper position for the mounting screws.

Separation Pad

The separation pad is located adjacent to the Registration Roller, and can be removed without prior removal of any other parts.

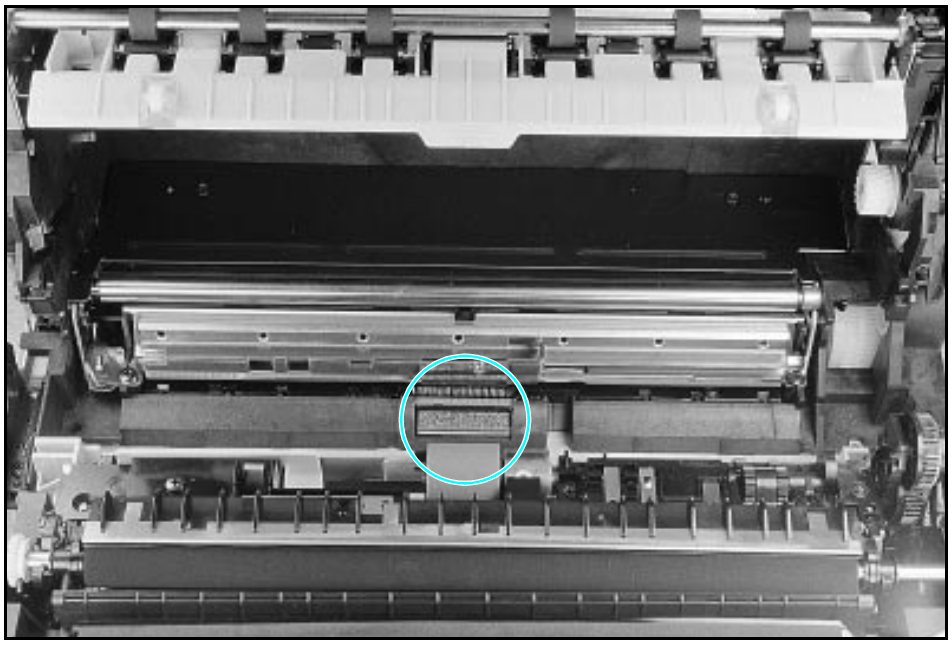
CAUTION

Removing the Separation Pad using a screwdriver is likely to damage it. Do not attempt to remove the Separation Pad unless you have a new replacement pad available.

To remove:

Use a small flat-blade screwdriver to pry firmly upward at either end of the separation pad (Figure 6-32).

Figure 6-32



Separation Pad

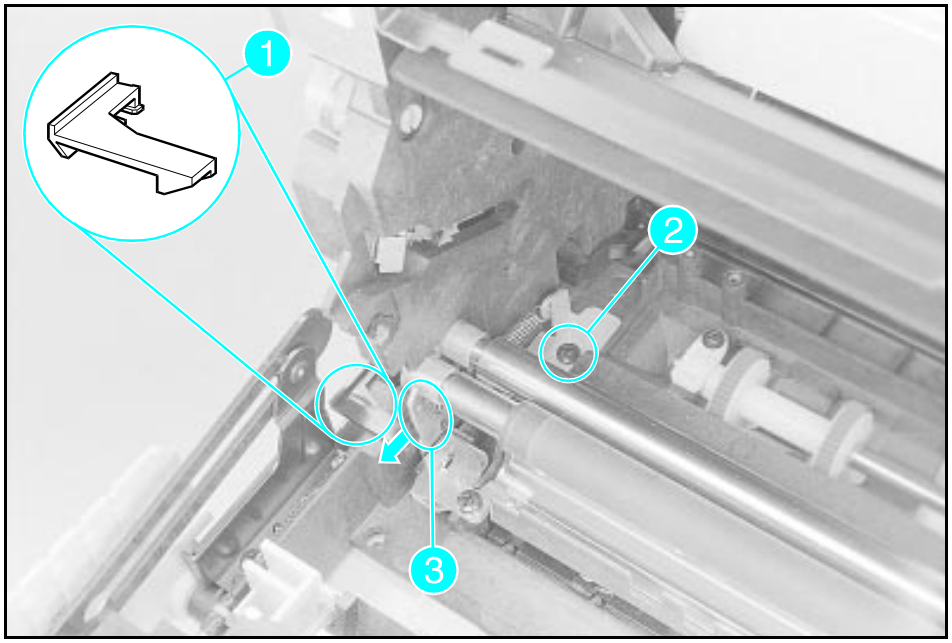
Registration Roller

The Registration Roller requires a stubby magnetic screwdriver and prior removal of the covers and toner cartridge guide. Removal of the left end of the Registration Roller is described below. The right end is similar except there is no plastic retainer tab or metal grounding tab.

1. Lift the end of the plastic retainer tab upward and slide to the left to remove (Figure 6-33, callout 1).
2. Remove the self-tapping screw holding the spring retainer plate in place (Figure 6-33, callout 2). The spring retaining plate is under tension and will pull to the front as the screw is loosened. Be careful not to drop the screw into the printer chassis.
3. Carefully pull the roller retaining arm to the front while sliding the left end of the roller out of its alignment slot (Figure 6-33, callout 3).
4. Release the right end of the roller in a similar manner.

NOTE Refer to Figure 6-34 for reinstallation details.

Figure 6-33



Registration Roller (1 of 2)

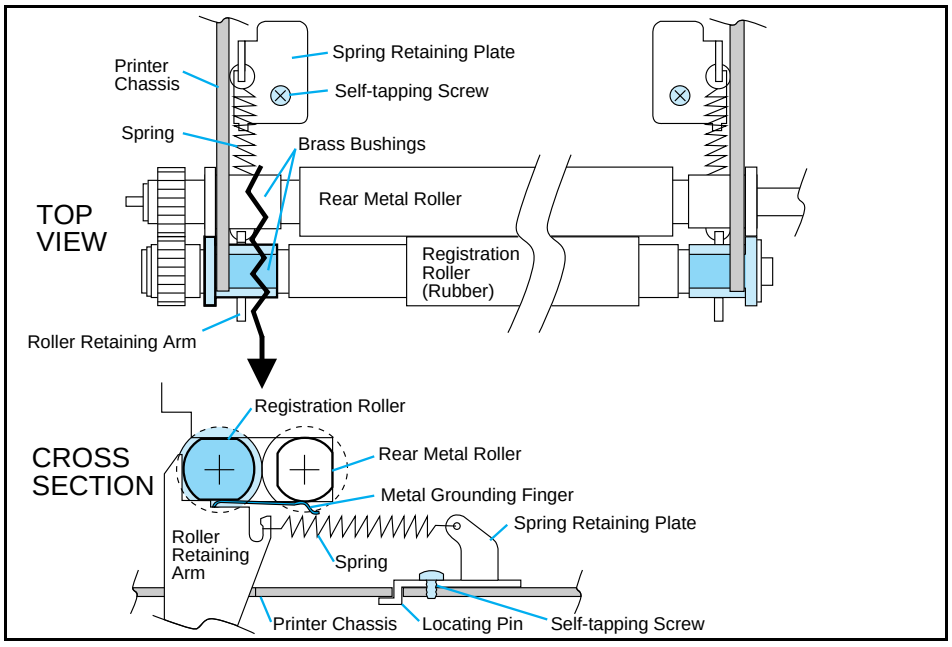
(continued on next page)

To Reinstall (Registration Roller):

NOTE Refer to Figure 6-34 while reinstalling.

1. NOTE the placement of the thin metal grounding tab (see Figure 6-34, side view) on the left retainer arm. It must slide underneath the bushing on the rear Transfer Roller as you carefully ease the left retaining arm and left Registration Roller bushing back into place.
2. NOTE the position of the brass bushings on the ends of the Registration Roller (see Figure 6-34, top view). The flat sides must be horizontal and the flanges must be outside of the chassis slots.
3. Make sure that the gear on the left end of the Registration Roller is properly meshed before replacing the screws.
4. Make sure that the spring retaining plate locating pin is inserted through the hole in the chassis.
5. When replacing the screws holding the spring retainer plates, rock the plates toward the rear and hold them flat while inserting and starting the screws. Make sure that the screws are fully tightened before proceeding.

Figure 6-34



Registration Roller (2 of 2)

Registration Roller Guide Plate

The Registration Roller Guide Plate is a metal assembly located directly under the Registration Roller and requires prior removal of the Registration Roller.

1 Remove the Registration Roller (see Figure 6-33).
2 Remove (2) self-tapping screws (Figure 6-35).
3 Lift the Registration Roller Guide Plate up and out of the printer.

Figure 6-35

Registration Roller Guide Plate

To Reinstall:

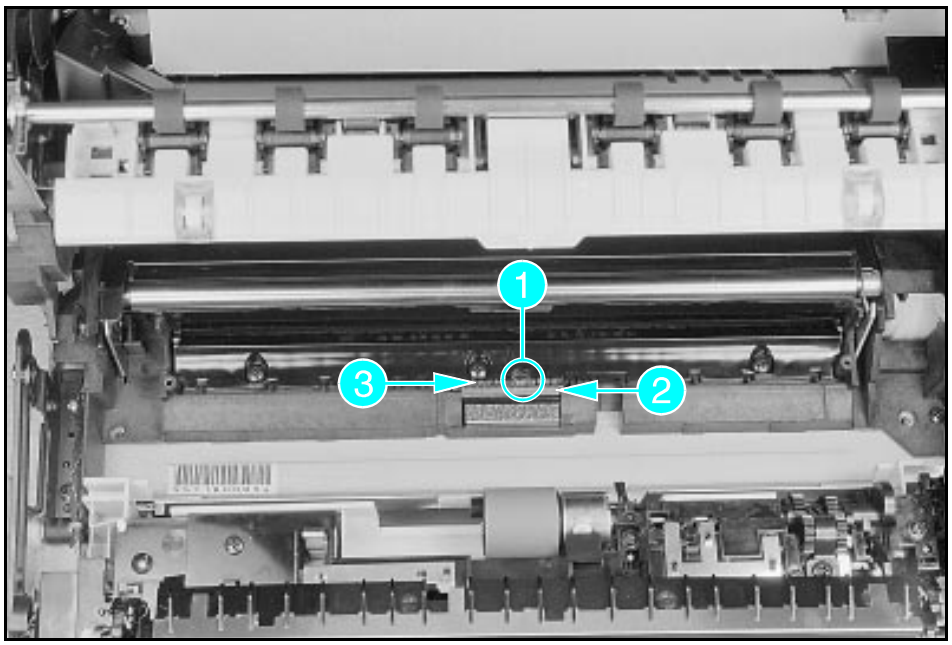
Be careful not to damage the two grounding tabs on the left end of the Guide Plate as you insert it into place.

Anti-Static Brush

The Anti-Static Brush is located directly under the Registration Roller Guide Plate.

1. Remove the Registration Roller and Guide Plate (see Figure 6-35).
2. Remove (1) machine grounding screw with star washer (Figure 6-36, callout 1).
3. Lift the sheet metal grounding plate out (Figure 6-36, callout 2).
4. Lift the Anti-Static Brush up and out of the printer (Figure 6-36, callout 3).

Figure 6-36



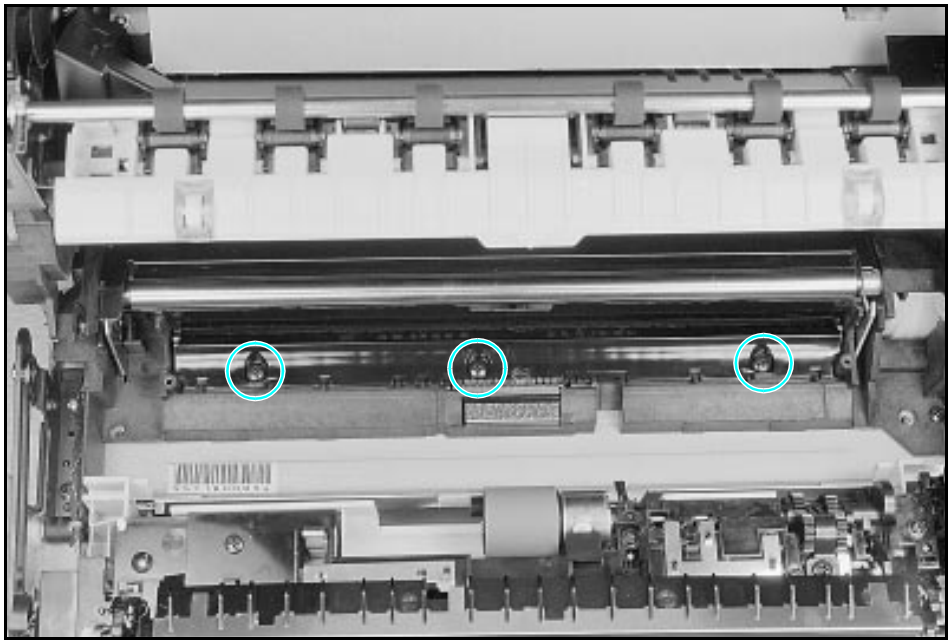
Anti-Static Brush

Paper Guide

The Paper Guide is a plastic plate located directly under the Registration Roller assembly.

1. Remove the Registration Roller and Guide Plate (see Figures 6-33 and 6-35).
2. Remove (3) self-tapping screws (Figure 6-37).
3. Carefully lift the Paper Guide up and out of the printer.

Figure 6-37



Paper Guide

Bottom Assemblies

Foot Assemblies

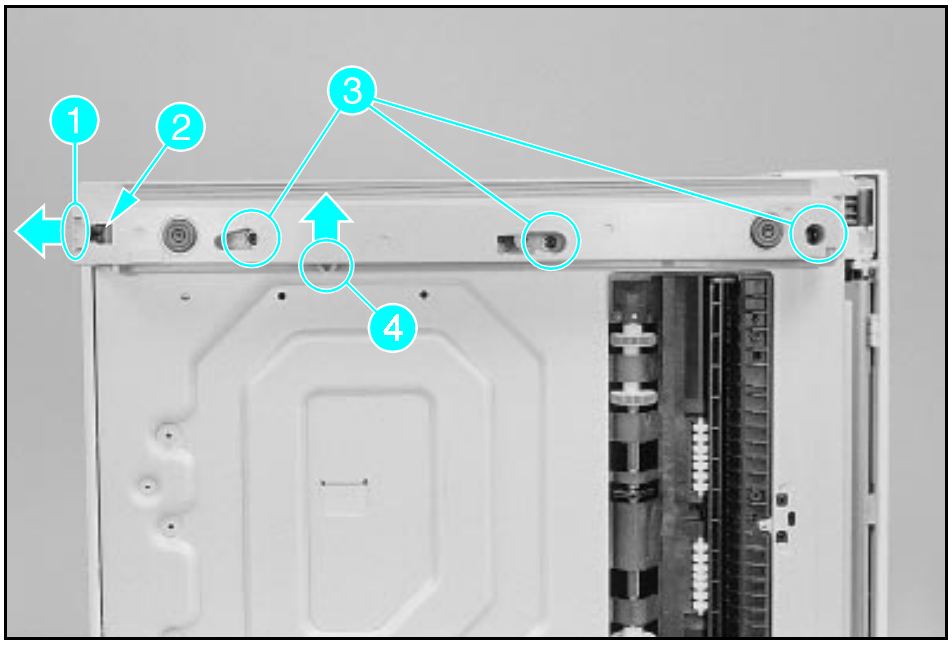
The Left Side Foot removal procedure is described below. The Right Side Foot removal is similar.

CAUTION

If the left side cover is in place, do not rest the printer on its left side, as this will damage the ventilation grill.

1. Remove lower paper cassette and turn the printer on its side.
2. Remove connector cover (if installed) (see Figure 6-38, callout 1).
3. Remove the Optional Lower Cassette connector by depressing the retainer ears inward (see Figure 6-38, callout 2).
4. Remove (3) machine screws (see Figure 6-38, callout 3).
5. Carefully pull the foot straight out while pushing the sensor tabs out of the way (see Figure 6-38, callout 4).

Figure 6-38



Left Side Foot

To Reinstall:

Install the Optional Lower Cassette connector before reinstalling Foot assemblies.

7

Troubleshooting

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Preliminary Troubleshooting

Step	Description	Corrective Action
1.	Disconnect printer from network (if applicable).	n/a
2.	Ensure that toner cartridge is installed, front door is closed, and AC power is applied.	n/a
3.	Verify power distribution by listening to fans, Main Motor, and Laser/Scanner Motor.	Troubleshoot power supply distribution system. • Check all connectors • Check CB101 in power supply unit • Check F101 in power supply unit
4.	Check for control panel messages.	Refer to “Printer Message Troubleshooting” later in this chapter.
5.	Perform Engine Test.	If there is an image problem, see “Image Formation Troubleshooting” later in this chapter. If no page is printed, troubleshoot as a DC Controller problem.
6.	Perform Control Panel Self Test.	If there is an image problem, refer to “Image Formation Troubleshooting” later in this chapter. If no page is printed, troubleshoot as a Formatter problem.
7.	Verify proper software drivers have been installed.	Install drivers.
8.	Connect printer to network (if applicable) and verify network operation.	Contact network administrator for assistance.

Paper Path and Components

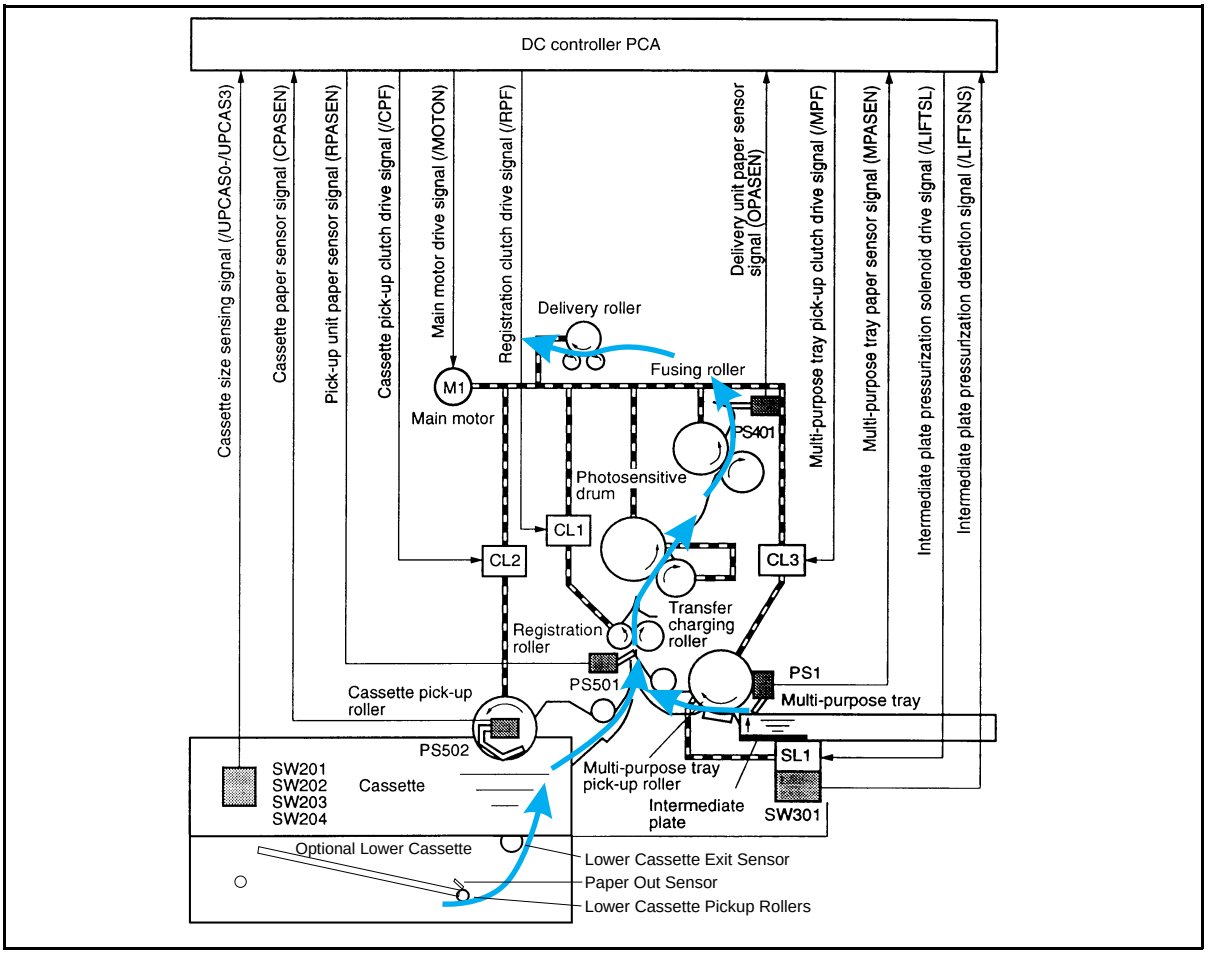


Figure 7-1 Paper Path and Components

Printer Message Troubleshooting

The control panel alphanumeric display provides the following information:

- Status Messages (refer to Table 7-1)
- Service and Error Messages (refer to Table 7-2)
- Clearable Warnings (refer to Table 7-3)

NOTE

Before troubleshooting the printer, cycle the power to the printer to see if the error persists.

Priority of Errors

Each error has a priority in relation to the others. If there is more than one error condition at the same time, the highest priority error will be displayed. The priority of errors is:

1. Service Errors
2. Door Open/No Toner Cartridge
3. Paper Jam
4. Paper Out
5. Memory Error
6. Manual Feed

Printer Status Messages

The following table lists printer messages and their meanings and describes recommended actions. Messages that begin with a number are listed first, followed by messages that begin with a letter.

Table 7-1 Status Messages

Message	Description	Recommended Action
Numeric Listings		
[Blank Display]	Nothing displayed at power-up. Control panel display remains blank.	If fans are functional on power-up: 1. Verify the input power, then check that CB101 and F101 are not open. 2. Check and reseat connector from the Control Panel to the Formatter PCA. 3. Remove any interface cables to the host. 4. Print an Engine Test to determine if the print engine is functional. If so, replace the Control Panel, then the Formatter PCA.
00 READY	The default ready message. The printer is ready to use.	No action required.
00 POWERSAVE	Printer is in Power Save mode. In Power Save mode all control panel keys operate normally.	Press any control panel key to take printer out of Power Save mode. Receipt of data or an error condition will also take the printer out of Power Save mode. The display will read 02 WARMING UP, and the job will print when the fuser has warmed.
00 OFFLINE	Printer is off line and cannot receive data.	Press **On Line**.
02 WARMING UP	The printer is warming up and is not ready to accept data.	Wait until the printer signals ready. If the message remains on continuously: 1. Disconnect interface cable from the printer, power off, then on. Problem may be caused by connecting the parallel cable to a serial port, or a bad host interface. 2. Check if Fusing Assembly is warming up. If not, replace the Fusing Assembly. 3. Replace the DC Controller PCA. 4. Replace the Power Supply Unit. 5. Replace the Formatter PCA.
04 SELF TEST	Printing a continuous self test.	Press **On Line** or **Shift** + **Continue** to stop the test. Several more pages may print.
05 SELF TEST	Printer self test in process (non-printing).	No action required.
06 PRINTING TEST	Printing a self test.	No action required.
06 TYPEFACE LIST	Printing a Typeface List. (Note that PCL/PostScript formats are different.)	No action required.

Table 7-1 Status Messages — continued

Message	Description	Recommended Action
06 DEMO PAGE	Printing a Demonstration Page. (Note that PCL/PostScript formats are different.)	No action required.
06 CONFIG PAGE	Printing a Configuration Page.	No action required.
07 RESET	Follows a control panel Shift + Reset selection. The printer returns all Printing, PCL, Job, and installed personality (PS, etc.) Menu items to user-selected settings and clears buffered page data, clears temporary soft fonts, and clears temporary macros.	No action required unless the printer is receiving data. You may have to press Shift + Reset several times to prevent printing unwanted pages.
08 COLD RESET	The printer returns all Printing, PCL, Job, Config, Mem Config, Parallel, MIO (if installed), and the installed personality (PCL, PS, etc.) Menu settings to their factory default configurations, except for page count, MP Tray size, and display language.	Reconfigure the printer and MIO. When you install an MIO card, to reinitialize the control panel you may need to perform a cold reset. (Note: In a shared environment, this task should only be performed by the system administrator.) To perform a cold reset, hold down On Line while switching the printer ON until 08 COLD RESET appears in the display.
09 MENU RESET	Clears the page buffer, removes temporary data such as downloaded fonts, and sets user-selected defaults (such as Power Save) to their factory defaults.	To access, press Shift + Reset for about 10 seconds until RESET=MENU appears, then use the + key to select the kind of reset you want.
09 RST ACTIVE I/O	Clears the page buffer and removes temporary data such as downloaded fonts, but affects the active I/O port only.	Same as 09 MENU RESET above.
09 RESET ALL I/O	Clears the page buffer and removes temporary data such as downloaded fonts, but affects all I/O ports.	Same as 09 MENU RESET above.
10 RESET TO SAVE	You changed menu items while data, temporary fonts, or temporary macros were present in printer memory or while the printer was in the middle of a job.	Reset the printer. There are two choices: 1. To immediately activate the selections, press Shift + Reset until 07 RESET appears (you will delete temporary macros, fonts, and buffered data). 2. Press Shift + Continue or On Line. Your changes will remain recorded in the menu (marked with an *), but will not become active until the printer is reset or the printer detects the end of the job.

Table 7-1 Status Messages — continued

Message	Description	Recommended Action
12 PRINTER OPEN	The front door is not firmly closed, or the toner cartridge is not installed correctly.	Make sure the toner cartridge is fully seated and the front door is firmly closed. If the message persists: 1. With the front door open, check that the sensor flag for Front Door Open Sensor (PS402) is not broken or stuck. (PS402 is located on the small Front Door Unit Terminal PCA on the front door under the Transfer Roller.) 2. Check functionality of the toner cartridge microswitch (SW501) on the High Voltage PCA (activated by metal tab in the rear wall of the toner cartridge cavity, adjacent to the high voltage contacts). 3. Replace the DC Controller PCA.
13 PAPER JAM	Paper is jammed in the paper path, or a paper jam sensor may be stuck, causing a false paper jam warning. The jam rate specifications are: MP TRAY: 1 per 6000 CASSETTE: 1 per 4000 **NOTE: Many variables can affect actual frequency of jams. The above specifications are intended as a general guideline only.**	*Remove jammed paper* (see "Clearing Paper Jams" in the *User's Manual*). The front door must be opened and closed again before pressing On Line to resume. The following are the most likely causes of repeated paper jam problems: 1. Paper cassettes not correctly loaded (refer to the *User's Manual*). 2. Print media does not meet specs or is in poor condition (refer to the *Paper Specifications Guide*). 3. The printer needs cleaning (refer to Chapter 4). 4. Pickup, Registration or Output rollers contaminated, worn or damaged. 5. Toner cartridge gears are worn or damaged (try a different cartridge). 6. Other paper path gears worn or damaged. If no paper jams are found but the message persists (false paper jams): 1. Check paper jam sensor flags for sticking or damage. Paper movement is monitored by (2) paper sensors. PS 501, the Pickup Unit Sensor is located on the High Voltage Power Supply PCA high voltage power supply PCA;pickup unit sensor. PS401 is located on the small front door Unit Terminal PCA on the front door under the Fusing Assembly (remove the Fusing Assembly to see). 2. Replace the DC Controller PCA.

Table 7-1 Status Messages — continued

Message	Description	Recommended Action
14 NO TONER CART	The toner cartridge is missing or not installed correctly.	Insert a toner cartridge or make sure the cartridge is fully seated and the front door is fully closed, then press On Line to resume. If the error persists: 1. Check functionality of the toner cartridge microswitch (SW501) on the High Voltage PCA (activated by metal tab in the rear wall of the toner cartridge cavity, adjacent to the high voltage contacts). 2. Check that the sensor flag for Front Door Open Sensor (PS402) is not broken or stuck. (PS402 is located on the small front door Unit Terminal PCA on the front door under the Transfer Roller.) 3. Replace the DC Controller PCA.
16 TONER LOW	The toner cartridge is running out of toner. If TONER LOW=CONT* is displayed, the printer will continue printing; if TONER LOW=STOP, the printer will stop printing and go off line.	Shake the toner cartridge or replace it. If TONER LOW=STOP, press On Line or Shift + Continue to allow printing to continue (print quality will gradually degrade). If the message persists: 1. Check the contact points on the left end of the toner cartridge and inside the toner cartridge cavity. (The Toner Low contact is the lower of the three.) 2. Replace the High Voltage PCA.
18 MIO INIT	The MIO card is initializing. This is a status message; during initialization the MIO is not active, but since the printer supports I/O switching, the printer remains on line.	No action required. Display will clear automatically (this may take up to a minute, depending on the card). However, if the message remains after 5 minutes a problem may exist in the network card or host. Consult the network documentation that came with the MIO card.
18 MIO NOT READY	The MIO card is not ready. The Bi-Tronics parallel port will continue to operate normally.	If the printer MIO card is operating correctly and communicating with the network, this message will disappear after approximately one minute and no action is required. If the MIO card is unable to communicate with the network, this message will remain for five minutes and then go away. In this case the printer is not communicating with the network (even though the message is no longer present). The problem may be a bad MIO card, bad cable/connection on the network, or a network problem. Consult the network documentation that came with the MIO card.

Table 7-1 Status Messages — continued

Message	Description	Recommended Action
Alphabetical Listings		
FS DISK FAILURE	Printer detected a disk failure.	Printer operation may continue, provided access to the disk is not required. (The printer will substitute fonts if necessary.) Press Shift + Continue, to continue printing when this error occurs. Switch the printer OFF and then back ON. If the error continues: 1. Remove and reseat the disk drive, ensuring that the connector pins are fully seated in the connector on the Formatter PCA. 2. Run a control panel self test to verify presence of the disk drive (look for the text, “Installed options: Disk”). 3. If the error persists, replace the disk drive.
MENUS LOCKED	The network administrator has locked out access to the control panel menu system, except for the Test Menu and MP Tray size.	See the network or printer administrator.
ME FEED *envelope size*	The printer requested that an envelope be manually fed. Envelope size may be: COM10, MONARCH, DL, C5, B5, JPOST, or JPOSTD.	Insert the appropriate envelope size into the MP Tray and press On Line or Shift + Continue if MP Tray is not in “first” mode to print from the envelope feeder.
MF FEED *paper size*	The printer requested that media be manually fed. Paper size may be: LETTER, LEGAL, A4, EXEC, 11x17, A3, JIS B4, JIS B5, CUSTOM.	Insert the appropriate paper size into the MP Tray and press On Line; or, press Shift + Continue (if the MP Tray is not in “first” mode).
MP LOAD, PC LOAD, or LC LOAD *paper size*,or *envelope size*	The printer received a request for a paper or envelope size not available in the printer.	MP LOAD: Load MP Tray with the requested media. If the size is not selected in the printer control panel, use the MP Paper Size key to enter the requested size, or press Shift + Continue to draw the requested size from another source, if available. Note: If MP LOAD remains in the display, you may have to clear the buffer by resetting the printer. Press Shift + Reset. PC or LC LOAD: Load the Paper Cassette or Lower Cassette with the requested media. Also, the back paper guide in the cassette must be set to the correct media size (the printer determines the media size by reading the location of this guide).

Table 7-2 Service and Error Messages

Message	Description	Recommended Action
20 MEM OVERFLOW	The printer received more data from the computer than can fit in its available user memory.	Press Shift + Continue to print the transferred data (data loss may result), then: make more memory available in the printer by removing some fonts, macros, or any other data from memory; or, simplify the page sent to the printer; or, install additional memory. (Note, if AUTO CONT=ON the printer will automatically continue printing when this error occurs).
21 PRINT OVERRUN	The data (dense text, rules, raster or vector graphics) sent to the printer was too complex.	Press Shift + Continue to resume printing. (Note, if AUTO CONT=ON the printer will automatically continue printing when this error occurs). Some data loss may occur. Try to simplify the print job. If you must print the job "as is," set PAGEPROTCT=ON in the Job Menu, print the job, then return PAGEPROTCT=AUTO. Do not leave PAGEPROTCT set to ON as it will *degrade performance.*
22 PAR IO ERROR, 22 MIO ERROR	For Bi-Tronics parallel (PAR) configuration, the computer and printer are not communicating because of improper signal protocols. This is an I/O buffer overrun error. Parallel Configuration: may mean a loose cable connection or a bad or poor quality cable. MIO Configuration: This is an I/O buffer overrun error.	Press Shift + Continue to clear the error message (data will be lost). If the error continues: Parallel Configuration: check for loose cable; use a high-quality cable (HP 24542D or equivalent). (Note: some non-HP parallel cables may be missing pin connections.) If the printer is using an I/O other than the Bi-Tronics parallel I/O, see the manual for that device.
40 MIO ERROR	Indicates an abnormal connection break occurred while transferring data from the computer.	Press Shift + Continue to clear the error message. If the printer is using an I/O other than the Bi-Tronics parallel I/O, see the manual for that device.
41.[X] ERROR *X=1, 2, 4, or 5*	A temporary printing error occurred.	Remove the page from the output bin and press Shift + Continue. The page containing the error will automatically be reprinted. (Note, if AUTO CONT=ON the printer will automatically continue printing when this error occurs.)
41.3 PAPER ERROR	The wrong size paper was fed from the MP Tray or the printer picked two sheets of paper at once.	Ensure that the paper is within the specifications. *If the page jammed, remove the jam. Press* Shift + Continue and the page containing the error will automatically be reprinted. NOTE: If AUTO CONT=ON the printer will automatically continue printing when this error occurs. Refer to the error 13 PAPER JAM earlier in this table for more information.

Table 7-2 Service and Error Messages — continued

Message	Description	Recommended Action
50 SERVICE	Fuser malfunction, resulting from either an overheating or underheating condition.	Switch the printer OFF *for at least 20 minutes* and then back ON. If the error continues: 1. Verify that the Fusing Assembly is installed correctly and is fully seated into its connectors (no bent pins or pins outside their receptacles). 2. Reseat or replace the fuser cable assembly.
51 ERROR	Beam detect malfunction.	Press Shift + Continue to resume operation. (Note, if AUTO CONT=ON the printer will automatically continue printing when this error occurs.) If error persists: 1. Check cable from DC Controller to Laser/Scanner Assembly. 2. Replace Laser/Scanner Assembly. 3. Replace DC Controller PCA.
52 SERVICE	Scanner malfunction.	Switch the printer OFF and then back ON. If the error continues: 1. Check cable from DC Controller to Laser/Scanner Assembly. 2. Replace Laser/Scanner Assembly. 3. Replace DC Controller PCA.
53.XY.ZZ ERROR	SIMM memory error: **X (Hardware Type):** 0: ROM 1: RAM **Y (Hardware Device):** 0: Internal Memory 1: SIMM Slot 1 2: SIMM Slot 2 3: SIMM Slot 3 4: SIMM Slot 4 **ZZ (Error Number):** 0: Unsupported memory 1: Unrecognized memory 2: Unsupported memory size 3: Failed RAM test 4: Exceeded maximum RAM size 5: Exceeded maximum ROM size 6: Invalid SIMM speed 7: SIMM reporting information incorrectly 8: SIMM RAM parity error 9: SIMM ROM needs to be mapped to an unsupported address 10: SIMM address conflict 11: ROM out of bounds 12: Could not make temporary mapping	Make sure the SIMM board is installed correctly. Replace the SIMM that caused the error. NOTE: If no replacement SIMM is available, press Shift + Continue to continue. The SIMM that caused the error will not be configured. If the SIMM device has more than one bank of memory, the good banks will be configured.

Table 7-2 Service and Error Messages — continued

Message	Description	Recommended Action
55 ERROR	Communication error between DC Controller and Formatter PCA.	Switch the printer OFF and then back ON. If the error continues: 1. Check cable from DC Controller to Laser/Scanner Assembly. 2. Replace Laser/Scanner Assembly. 3. Replace DC Controller PCA.
57 SERVICE	Main motor failure.	Switch the printer OFF and then back ON. If the error continues: 1. Check cabling between Main Motor and DC Controller PCA. 2. Replace the Main Motor. 3. Replace the DC Controller.
58.[x] SERVICE	Fan motor failure. x = 1 — FM1 2 — FM2 3 — FM3	Switch the printer OFF and then back ON. If the error continues: 1. Check cabling between fan motor(s) and DC Controller PCA. 2. Replace the faulty fan motor. 3. Replace the DC Controller.
61.[x] SERVICE *X=0 - 4*	The printer encountered a parity error when accessing the RAM *memory SIMM in slot "X". If X=0, the slot with the defective SIMM could not be determined.*	Switch the printer OFF and then ON. If the error is still present: 1. Verify that the SIMM board is correctly installed. 2. Switch the printer OFF and remove the SIMM board. Switch the printer back ON. If the error message does not appear, replace the faulty SIMM. 3. If the message remains, repeat the process for each remaining SIMM to isolate. 4. If message remains with no SIMMs present, replace the Formatter PCA.
62.[x] SERVICE *X=0 - 6*	The printer identified a problem while checking its memory. *"X" refers to the device the printer was checking when it encountered the error.* *0: Internal Memory* *1–4: SIMM Slot* *6: Cache*	Switch the printer OFF and then ON. If the error is still present: 1. Verify that the SIMM board is correctly installed. 2. Switch the printer OFF and remove the SIMM board. Switch the printer back ON. If the error message does not appear, replace the faulty SIMM. 3. If the message remains, repeat the process for each remaining SIMM to isolate. 4. If message remains with no SIMMs present, replace the Formatter PCA.
63 through 67 SERVICE	Internal RAM, scan buffer, Dynamic RAM controller, or miscellaneous interface hardware error.	Switch the printer OFF, then back ON. If the error persists, replace the Formatter PCA.
68 ERROR	Nonvolatile memory (NVRAM) error.	Press **Shift** + **Continue**, then check the control panel settings for changes (print a self test).
68 SERVICE or 68 READY/SERVICE	The nonvolatile memory (NVRAM) is full.	Press **Shift** + **Continue** ; the 00 READY message will be replaced by 68 READY/SERVICE until the condition is cleared. If you switch the printer OFF, then ON, you may lose settings. (To check settings, print a self test). If the error persists, replace the Formatter PCA.

Table 7-2 Service and Error Messages — continued

Message	Description	Recommended Action
70 or 71 ERROR	A language (personality) SIMM problem was identified. SIMM not compatible with firmware.	Remove or replace the language (personality) SIMM.
79 SERVICE [xxxx]	A Formatter firmware error occurred. The numbers [xxxx] following the error indicate the specific kind of error.	Write the error message **and the four digit code** down before continuing. Switch the printer OFF, then back ON. 1. Remove SIMMs one at a time and recycle power to isolate. 2. If the problem persists, and the printer has an MIO card installed, remove the MIO and try using the parallel interface, if possible. 3. Replace the Formatter PCA. (Include the error message code with the defective PCA and return for evaluation.)
80 SERVICE [xxxx]	The printer detected a problem in the MIO card. The numbers [xxxx] following the error message indicate the specific type of error.	Write the error message **and the four digit code** down before continuing. Switch the printer OFF, then back ON. If the error persists: 1. Remove and reseat the MIO card. 2. Check for bent pins on the MIO connection. 3. Replace the MIO card. 4. Replace the Formatter PCA. (Include the error message and code with the defective PCA and return for evaluation.)

Clearable Warnings

A clearable warning message indicates that the printer changed settings in order to complete the print job. A clearable warning usually occurs when a transient condition, such as an invalid or uninstalled personality, or lack of memory causes a temporary change. A number of clearable warnings can appear while printing a job. The printer will remain on line while the message is displayed. Clear the message by pressing **Shift** + **Continue**. It is possible to eliminate the need to respond to clearable warning messages (see "Configuration Menu" in Chapter 3).

Table 7-3 Clearable Warning Messages

Message	Meaning
W0 JOB 600/A4	Because the job parameters of print resolution and page protection could not be met with the available memory, the job was printed at a print resolution of 600 dpi but reduced to a page protect setting of A4.
W1 IMAGE ADAPT	The printer received a graphics print file that was too complex to print at the requested print resolution. Check the printout for loss of data or print quality. NOTE: if this warning occurs frequently, install additional memory.
W2 INVALID PERS	The job was not printed because you requested a personality, such as PostScript, that is not installed. Install the personality that matches the personality of the files you are sending, together with enough memory to support that personality.
W3 JOB ABORTED	The printer was forced to abort the print job because there is not enough installed memory to support the current printer language (PostScript, for example). Install additional memory.
WD DISK NOT INIT	The printer was unable to read the root directory from the disk. Use the disk initialization utility to initialize the disk.
W8 JOB 600/OFF	Because the job parameters of print resolution and page protection could not be met with the available memory, the job was printed at a print resolution of 600 dpi and page protect was turned OFF.
W9 JOB 600/LTR	Because the job parameters of print resolution and page protection could not be met with the available memory, the job was printed at a print resolution of 600 dpi but reduced to a page protect setting of LETTER.
WM JOB 300	The job was printed at 300 dpi. NOTE: if this warning occurs frequently, install additional memory.
WM JOB 600/A3	Because the job parameters of print resolution and page protection could not be met with the available memory, the job was printed at a print resolution of 600 dpi but reduced to a page protect setting of A3.
WM JOB 600/LGL	Because the job parameters of print resolution and page protection could not be met with the available memory, the job was printed at a print resolution of 600 dpi but reduced to a page protect setting of LEGAL.
WM MEM CNFIG N/A	The printer did not have enough memory when switched ON to support the previous settings for I/O Buffering and/or Resource Saving, probably because you removed a memory SIMM, or added a new personality SIMM. (You can check settings by printing a self test.)
WM CHK MEM CNFIG	I/O Buffering and/or Resource Saving settings were altered when the printer was switched on because the printer did not have enough memory. This usually occurs after memory has been removed from the printer. (You can check settings by printing a self test.) Adding additional memory should correct this problem.

Image Formation Troubleshooting

Check the Toner Cartridge

Image formation defects are many times the result of toner cartridge problems. If there is any doubt, always replace the toner cartridge before troubleshooting image defects.

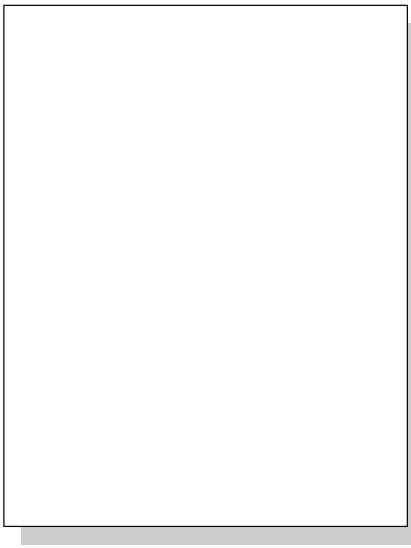
Use the following check list to ensure that the toner cartridge is still operable.

- Inspect the toner cartridge for remaining toner.
- Check the expiration date of the toner cartridge (stamped on the cartridge box).
- Check the toner cartridge to see if it has been disassembled or refilled.
- Ensure that the toner cartridge is seated properly in the cavity.
- Inspect the cartridge for leaking toner through worn seals. (If the drum has been manually rotated it may have caused internal damage and toner spills may result).
- Check the surface of the photosensitive drum in the cartridge to see if it has been damaged or scratched. Touching the drum will contaminate the photosensitive surface and may cause spotting and defects during printing.
- White areas on the page may indicate that the drum has been exposed to light for too long. If white areas appear, stop the printer and wait a few minutes. This process should eliminate most defective images. If not, the toner cartridge may be placed in a dark environment for several days, which may restore some life to the drum.

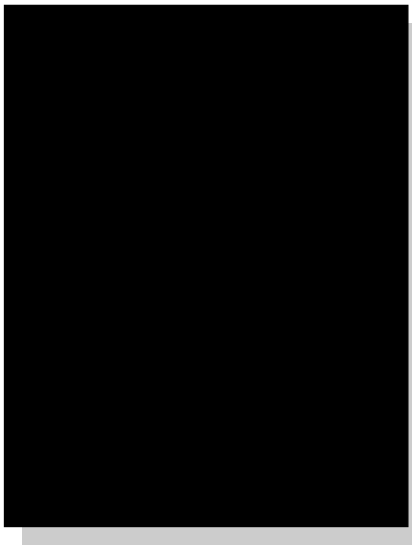
Faulty Image Examples

This section illustrates some image defects and their possible causes. Since there are many variables in the printing process, it is possible to encounter image defects that are not illustrated in the following illustrations. If you find a defect that is not illustrated, record the probable cause along with the printing environmental conditions and save a copy of the defect for future reference.

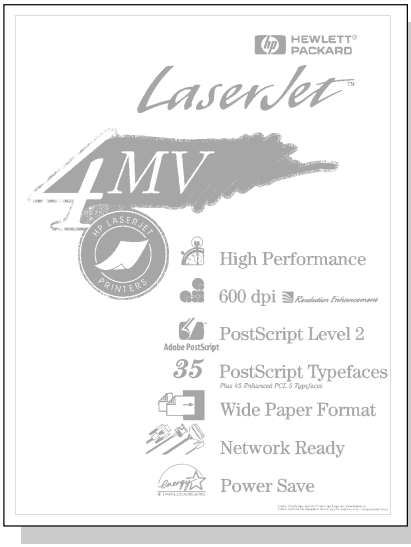
Each example is followed by a table that lists in order the probable causes of the image defect.



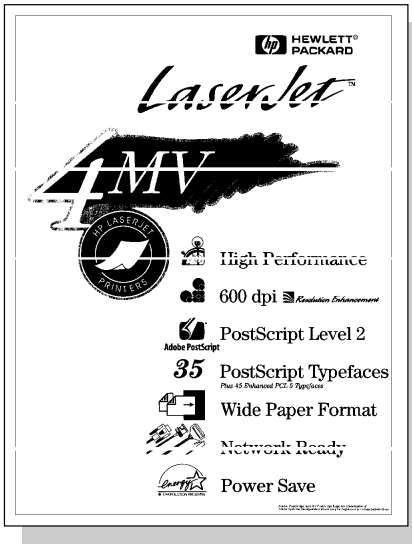
BLANK PAGE
(see Table 7-4, page 7-21)



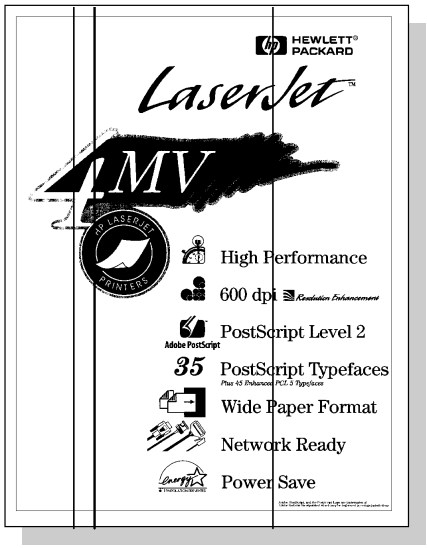
BLACK PAGE
(see Table 7-5, page 7-22)



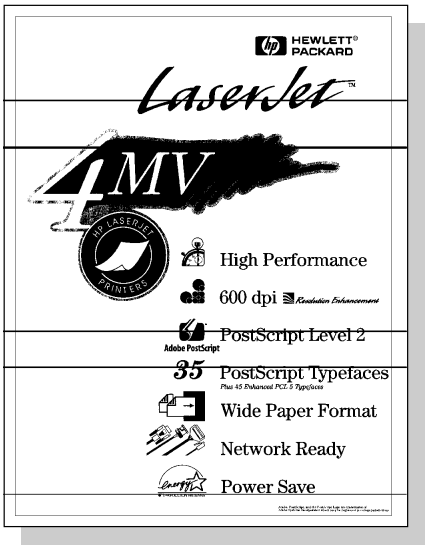
FADED PRINT
(see Table 7-6, page 7-23)



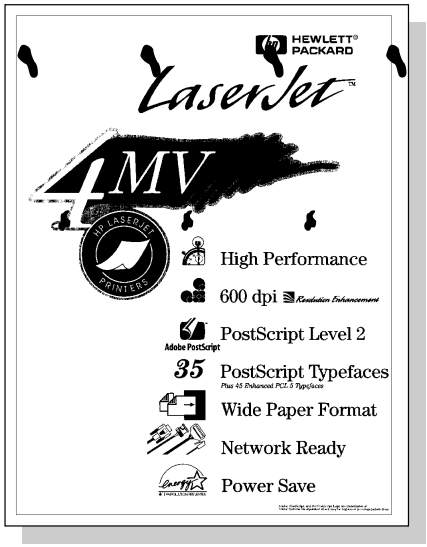
WHITE STRIPES (parallel to path)
(see Table 7-7, page 7-24)



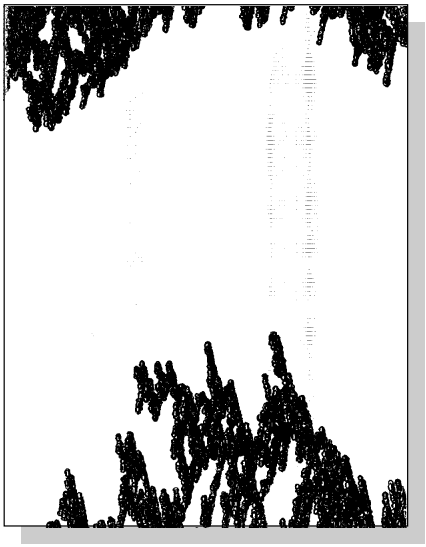
BLACK LINES (perpendicular to path)
(see Table 7-8, page 7-24)



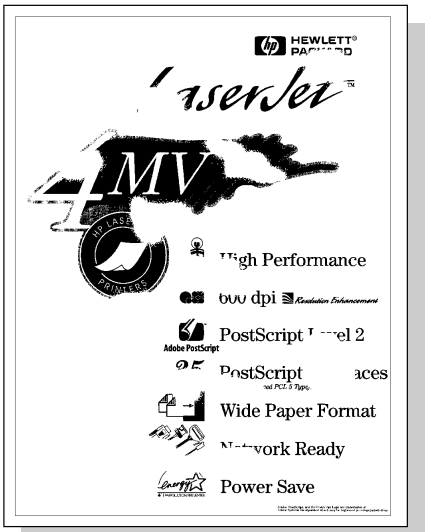
BLACK LINES (parallel to path)
(see Table 7-9, page 7-25)



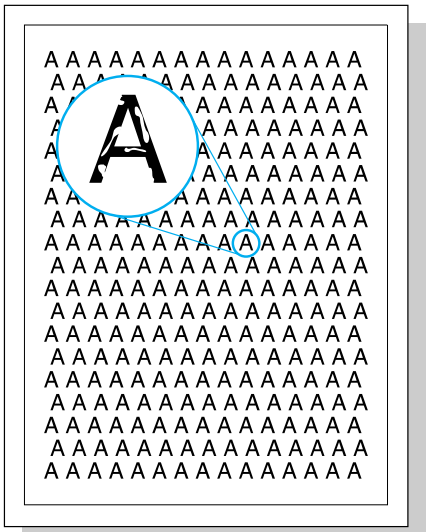
REPETITIVE DEFECTS
(see Table 7-10, page 7-25)



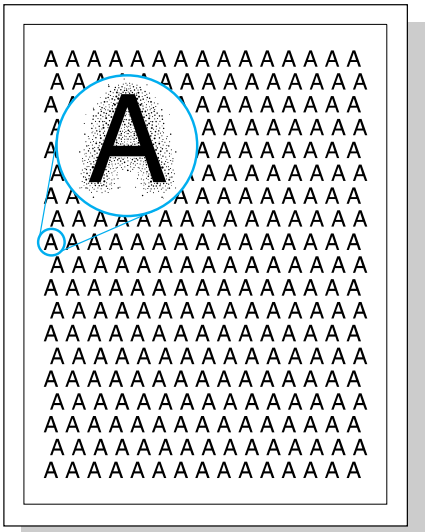
BUBBLE PRINT
(see Table 7-11, page 7-26)



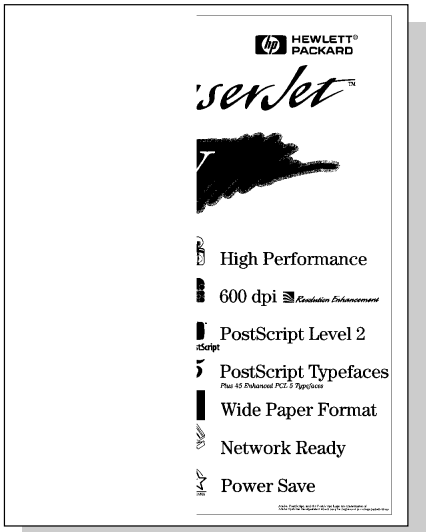
DROPOUT
(see Table 7-12, page 7-26)



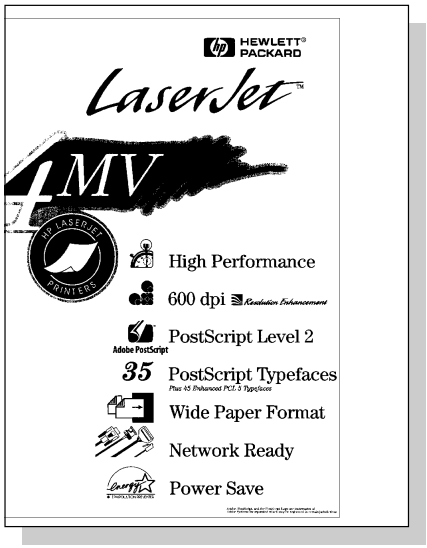
CHARACTER VOIDS
(see Table 7-13, page 7-27)



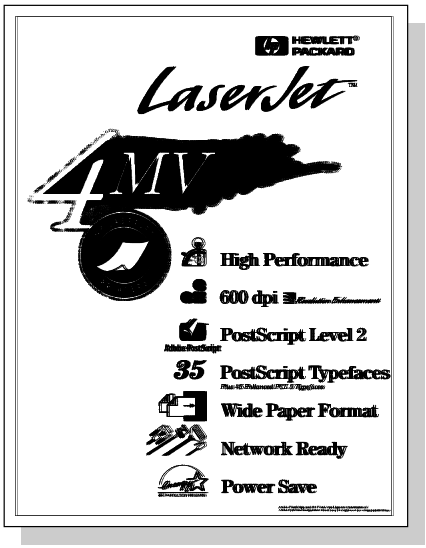
BACKGROUND SCATTER
(or Leading Edge Halo)
(see Table 7-15, page 7-28)



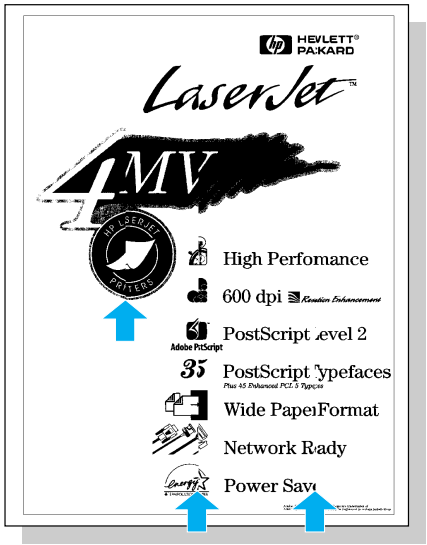
PARTIAL BLANK PAGE
(see Table 7-14, page 7-28)



FAULTY REGISTRATION
(see Table 7-16, page 7-29)



SMEARED PRINT
(see Table 7-17, page 7-30)



COMPRESSED PRINT
(see Table 7-18, page 7-30)

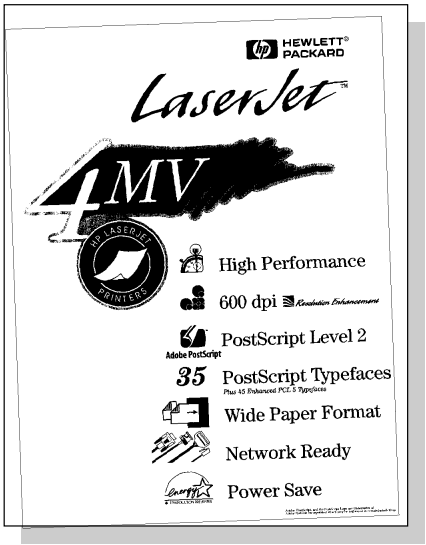


IMAGE SKEW
(see Table 7-19, page 7-30)

Table 7-4 Blank (White) Page

Possible Cause	Recommended Action
OCCASIONAL BLANK PAGES:	
1. Software Configuration.	Make sure the application software is not sending incorrect page length requests, or extra page eject commands.
2. Network Configuration. Some sharing devices on networks may generate a blank page as a separator.	Check with the Network Administrator.
3. Multiple Feeds. The printer may be feeding two or more pages at once because the paper is difficult to separate.	Remove the paper from the paper cassette and fan the paper edges to separate the pages (see *HP LaserJet Printer Family Paper Specifications Guide).*
ALL PAGES BLANK:	
1. Sealing tape left in toner cartridge.	Remove the sealing tape.
2. Empty or defective toner cartridge.	1. If unsure, weigh the cartridge: Full weight = 2000 grams (70.6 oz) Empty weight = 1600 grams (56.5 oz) NOTE: Some toner may reside in the waste toner cavity, affecting the weight of the cartridge. 2. Perform the "Drum Rotation Functional Check" described later in this chapter or try a known good toner cartridge. Replace the toner cartridge if necessary.
3. Defective or contaminated Transfer Roller. Without a functional Transfer Roller, toner cannot be pulled from the photosensitive drum to the paper.	Check roller installation and contact. Perform the "Half Self Test Functional Check" described later in this chapter. If there is an image on the drum, but not on paper, replace the Transfer Roller.
4. High voltage connector springs are dirty or defective. The high voltage connectors are mounted on the High Voltage Power Supply PCA and protrude into the toner cartridge cavity.	Check the springs for functionality. Clean if dirty, replace if defective or missing.
5. Laser/Scanner door not opening properly.	1. Remove and re-seat the toner cartridge. 2. Check the Laser/Scanner shutter door for proper operation. If defective, replace the Laser/Scanner Assembly.
6. High Voltage Power Supply is defective.	Replace the High Voltage Power Supply PCA.
7. DC Controller PCA is defective. The DC Controller supplies the proper voltage to the High Voltage Power Supply PCA.	Replace the DC Controller PCA.

Table 7-5 Black Page

Possible Cause	Recommended Action
1. Defective toner cartridge.	Replace the toner cartridge.
2. Light is leaking into the printer.	Ensure all covers are in place.
3. High voltage contact springs are dirty or defective. The high voltage contacts are mounted on the High Voltage Power Supply PCA and protrude into the toner cartridge cavity.	Inspect and clean the high voltage contacts. If damaged, replace the High Voltage Power Supply PCA.
4. High voltage power supply circuit is defective (not supplying the correct negative voltage).	Replace the High Voltage Power Supply PCA.
5. DC Controller PCA is defective. If the DC Controller turns ON the laser beam continuously, the entire surface of the Photosensitive drum is neutralized causing a completely black page.	Replace the DC Controller PCA.
6. Laser/Scanner Assembly is faulty (turning laser on continuously).	Replace the Laser/Scanner Assembly.
7. Connectors between the Laser/Scanner unit and DC Controller are not seated properly or are defective.	Inspect and reseat the connectors. Replace cables as necessary.

Table 7-6 Faded Print

Possible Cause	Recommended Action
1. Toner supply is low.	Shake the cartridge gently to redistribute the toner, or replace the cartridge.
2. Print Density is set incorrectly.	Change to a darker setting and retry printing.
3. EconoMode is on. EconoMode saves toner by reducing the dot density. This may appear to be a print quality problem in some cases.	Turn EconoMode off.
4. Paper does not meet specs. The moisture content, conductivity, or surface finish may not work correctly with the electrophotographic process.	Try a different paper lot (see *HP LaserJet Printer Family Paper Specifications Guide*).
5. Transfer Roller is defective or incorrectly installed. If the transfer roller loses conductivity, it cannot effectively pull toner from the drum to the paper.	Inspect the Transfer Roller for proper installation and contact. If the Transfer Roller is damaged, replace it.
6. Laser/Scanner door is not opening properly.	1. Remove and re-seat the toner cartridge. 2. Check the Laser/Scanner shutter door for proper operation. If defective, replace the Laser/Scanner Assembly.
7. High voltage contact springs are dirty or defective. The high voltage contacts are mounted on the High Voltage Power Supply PCA and protrude into the toner cartridge cavity.	Check the contacts for functionality. If dirty, clean using alcohol; if damaged, replace the High Voltage Power Supply PCA.
8. High Voltage Power Supply PCA is defective.	Replace the High Voltage Power Supply PCA.
9. DC Controller PCA is defective. The DC Controller supplies the proper voltage to the High Voltage Power Supply PCA.	Replace the DC Controller PCA.

Table 7-7 White Stripes (parallel to path)

Possible Cause	Recommended Action
1. Toner cartridge is nearly empty. This can cause uneven toner distribution.	Remove the toner cartridge and shake it gently. The cartridge will soon require replacement.
2. Toner cartridge has been exposed to too much light.	Store the toner cartridge in a darkened environment for several days. This may restore the photosensitive potential.
3. Foreign objects in beam path. Any foreign objects will block the light from developing an image on the Photosensitive drum.	Remove the toner cartridge and check for damage. Replace the toner cartridge if it is damaged. Remove the Printer Cover and inspect the path from the Laser/Scanner to the toner cartridge drum, looking for foreign objects in the beam path.

Table 7-8 Black Lines (perpendicular to path)

Possible Cause	Recommended Action
1. Toner cartridge is damaged.	Inspect the toner cartridge for a scratched photosensitive drum or toner leaking through worn seals. Replace as necessary.
2. Fusing Assembly is contaminated or damaged.	Inspect the Fusing Assembly for toner build-up or scratches on the fuser rollers. Try cleaning with alcohol. Replace the Fusing Assembly if damaged.
3. Static Eliminator Strip teeth are contaminated or defective.	Remove and inspect (see Chapter 6 for removal procedure). Clean using compressed air. Replace if damaged.

Table 7-9 Black Lines (parallel to path)

Possible Cause	Recommended Action
1. Toner cartridge not seated properly.	Remove the cartridge and reinsert it.
2. Toner cartridge defective.	Replace the cartridge.
3. Repetitive defect. If the lines are repeated at a consistent interval down the page, this is a repetitive defect.	Refer to Table 7-10 (next), as well as the "Repetitive Image Defect Ruler," (Figure 7-3).

Table 7-10 Repetitive Defects

Possible Cause	Recommended Action
1. Toner cartridge is damaged. The circumference of the photoconductive drum inside the toner cartridge is 94 mm (3.7 inches). If the defect repeats at this interval, the defect is associated with the drum (see note below).	Inspect the drum for scratches or damage. Replace the toner cartridge.
2. Dirty Rollers. Any dirty roller in the paper path may result in a repetitive print defect.	Examine and clean rollers in the paper path (refer to Chapter 4).
3. Fusing Assembly is dirty or defective. The circumference of the lower fusing Pressure Roller is 86 mm (3.46 inches). If the defect repeats at this interval, the defect is associated with the Pressure Roller (see note below).	Clean the Fusing Assembly using alcohol. If the problem persists, replace the Fusing Assembly.
4. Gears are worn, causing slippage or jumping.	Inspect the gears driving the toner cartridge and the Fuser. Replace the Main Drive Assembly if necessary.
5. Paper does not meet specs. The surface of the paper may be too coarse, causing repeated marks.	Try a different paper lot (see *HP LaserJet Printer Family Paper Specifications Guide*).

NOTE When troubleshooting repetitive image defects, use the Repetitive Image Defect Ruler, supplied in Figure 7-3 to measure the distance between recurring defects.

Table 7-11 Bubble Print

Possible Cause	Recommended Action
1. The density adjustment slider switch on the High Voltage Power Supply PCA slider switch is not aligned properly with the Print Density Dial. This causes the drum surface potential to be out of range.	1. Check the position of the Print Density Dial in the slider switch. If out of position, remove and reseat the High Voltage Power Supply PCA. 2. Replace the High Voltage Power Supply PCA.
2. Toner build-up in the Fusing Assembly. Toner build-up can physically damage the Fusing Assembly.	Remove and clean the Fusing Assembly (see Chapter 6).
3. Leaking toner cartridge.	Replace the toner cartridge.
4. Paper does not meet specs. The paper moisture content, conductivity, or surface finish may not work correctly with the electrophotographic process.	Try a different paper lot (see *HP LaserJet Printer Family Paper Specifications Guide*).

Table 7-12 Dropout

Possible Cause	Recommended Action
1. Single sheet of paper defective.	Try reprinting the job.
2. Paper does not meet specs. The paper moisture content, conductivity, or surface finish may not work correctly with the electrophotographic process.	Try a different paper lot (see *HP LaserJet Printer Family Paper Specifications Guide*).
3. DC Controller defective (low primary voltage).	Replace the DC Controller.
4. High Voltage Power Supply PCA defective	Replace the High Voltage Power Supply PCA.
5. Transfer Roller defective.	Replace the Transfer Roller.

Table 7-13 Character Voids

Possible Cause	Recommended Action
1. Paper surface too rough. Toner migrates to low spots, leaving higher areas void.	Use paper with correct finish (smoothness) meeting HP specifications (see *HP LaserJet Printer Family Paper Specifications Guide*).
2. Printing on wrong side of paper. The label on the ream of paper indicates which side to print on. The different surface properties of some papers may cause problems if loaded wrong side up.	Check for the arrow on the paper wrapper. Be sure paper is loaded with the **arrow pointing UP** in the paper cassettes, or **arrow pointing DOWN** in the MP Tray.
3. Paper surface too smooth for proper toner adhesion.	Use paper with correct finish (smoothness) meeting HP specifications (see *HP LaserJet Printer Family Paper Specifications Guide*).
4. Bad transparencies. Transparencies can have this problem because they are not designed for proper toner adhesion.	Use Hewlett-Packard approved transparencies (see *HP LaserJet Printer Family Paper Specifications Guide*).
5. Bad Transfer Roller. If the Transfer Roller has finger oils on its surface, is dirty or is worn-out, this problem can result.	Clean the Transfer Roller using a **dry, lint-free cloth**. DO NOT touch the Transfer Roller with your fingers. If the problem persists, replace the Transfer Roller Assembly.

Table 7-14 Background Scatter (or Leading Edge Halo)

Possible Cause	Recommended Action
Random Background Scatter	
1. Bad Media. The moisture content, conductivity or surface finish may not work correctly with the electrophotographic process.	Try a different media (see *HP LaserJet Printer Family Paper Specifications Guide*).
2. Inside of printer is dirty (toner may have leaked out of the toner cartridge).	Clean inside of printer (see Chapter 4). Install a new toner cartridge if leaking.
3. Printing on envelope seams. Printing on an envelope seam can cause a background scatter problem.	Move the text to an area without seams. If not printing on seams, try a higher print density setting (see item 6, below).
4. Defective toner cartridge.	Install a new toner cartridge.
5. Dirty or worn Transfer Roller. A worn Transfer Roller can cause background due to improper bias voltages.	Clean the Transfer Roller using a **dry, lint-free cloth**. DO NOT touch the Transfer Roller with your fingers. If the problem persists, replace the Transfer Roller Assembly.
6. Print Density set too low. If the Print Density is set too low, then background scatter can result, particularly with envelopes and heavier papers.	Adjust the print density to a higher setting.
Background Scatter at Leading Edge Only (Leading Edge Halo)	
1. This problem is caused by toner buildup in the Fuser Inlet Guide.	Replace Fuser Inlet Guide (see Chapter 6).

Table 7-15 Partial Blank Page

Possible Cause	Recommended Action
1. Page too complex. The printer can not create the image fast enough to keep pace with the print engine.	Set Page Protect to ON or AUTO.
2. Not enough memory. The page is too complex for standard printer memory.	Add printer memory. As an alternative, simplify the print job.
3. Printing on legal-size paper when software is specifying letter size (this will also cause paper jams).	Review software selection. Ensure that printing is on selected size.

Table 7-16 Faulty Registration

Possible Cause	Recommended Action
1. Overloaded paper cassette. If the cassette is overloaded, the Pickup Rollers may not pick correctly.	Reload proper amount of paper **squarely** in the cassette. Review paper loading with the customer.
2. Paper guide on the paper cassette adjusted too tight. If the guide is pushing too tightly against the paper, it may be delayed in being pulled into the printer.	Verify that the paper guide is adjusted for the correct paper size and is locked into position. Note that too loose a setting may cause image skewing.
3. Paper does not meet specs. The surface of the paper may be too smooth for the Pickup and Feed Rollers to correctly feed paper into the printer.	Try a different paper lot (see *HP LaserJet Printer Family Paper Specifications Guide*).
4. Worn or broken drive gears. If any gear within the drive train or paper path becomes excessively worn or dirty, erratic paper movement can result.	Replace the defective gear or Main Drive assembly.
5. Worn Pickup, or Registration Rollers. Paper is not being picked-up consistently.	Inspect all paper path rollers, looking for wear, cracks, or glazing. Replace the worn rollers.

Table 7-17 Smeared Print

Possible Cause	Recommended Action
1. Bad media. The moisture content, conductivity, or surface finish of the media being printed may not work correctly with the electrophotographic process.	Try a different paper lot or other media (see *HP LaserJet Printer Family Paper Specifications Guide*).
2. Dirty Fusing Rollers. Toner build-up can cause the print on a page to smear.	Remove and inspect the Fusing Assembly for excessive toner build-up. Clean using alcohol.
3. The Static Eliminator Strip is dirty or is not grounded, allowing a static charge to remain on the page.	Clean or replace the Anti-Static Brush. Use compressed air to clean (see “Anti -Static Brush” in Chapter 6).
4. Fusing Assembly is defective. The print will smear if the Fusing Assembly is not heated sufficiently to bond the toner image to the paper.	Replace the Fusing Assembly.
5. DC Controller is defective. The DC Controller regulates fusing roller temperature.	If a new Fusing Assembly does not resolve the problem, replace the DC Controller PCA.

Table 7-18 Compressed Print

Possible Cause	Recommended Action
1. Toner cartridge bushings are too tight. This may occur on refilled toner cartridges.	Replace the toner cartridge.
2. Broken or worn gear.	Inspect and replace the worn gear or assembly.

Table 7-19 Image Skew

Possible Cause	Recommended Action
1. Paper is loaded incorrectly. If the paper is not installed flush into the paper cassette, a skewing problem will result.	Remove paper from the tray and install paper correctly. Position the paper guide correctly for the paper size being used.
2. Bad Paper Lot. Paper that is manufactured poorly or inconsistently, or that has too smooth or too rough a surface texture can cause an image skew problem.	Try a different paper lot (see *HP LaserJet Printer Family Paper Specifications Guide*).
3. Worn Pickup and/or Registration Rollers. Paper is not being picked-up consistently.	Inspect all paper path rollers, looking for wear, cracks, or glazing. Replace the worn rollers.

Troubleshooting Checks

Engine Test

The engine test print is used to verify that the print engine is functioning correctly. The Formatter PCA is completely bypassed during an engine test. This test is very useful for isolating printer problems. The engine test prints a full page of horizontal lines down the entire printable area, and is also useful for checking and adjusting registration.

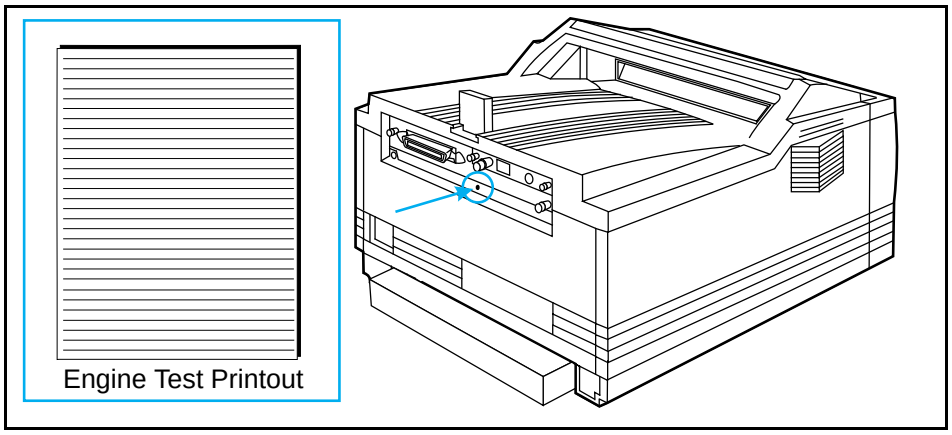
Engine Test Button Location

The engine test print button (SW7001) is located on the DC Controller PCA. It is accessible through a hole at the rear of the printer.

Printing an Engine Test

To print an engine test, use a non-metallic object to press the engine test button (see Figure 7-2). A single test page is printed.

Figure 7-2



Engine Test Button and Printout

Half Self Test Functional Check

The electrophotographic process can be subdivided into the following stages:

- Cleaning (removing excess toner from drum surface)
- Conditioning (placing a uniform electrical charge on drum)
- Writing (laser strikes surface of drum to create latent image)
- Development (formation of the toner image on drum)
- Transfer (charge to transfer the image to paper)
- Fusing (heat and pressure to produce a permanent image)

The purpose of the Half Self Test Check is to determine which process is malfunctioning. Perform the test as follows:

1. Initiate a printer control panel self test.
2. Open the Front Door after the paper advances half-way through the printer (about five seconds after the Main Motor begins rotation). The leading edge of the paper should have advanced past the toner cartridge.
3. Remove the toner cartridge.
4. Open the toner cartridge's drum shield to view the drum's surface.

If a *dark and distinct toner image is present* on the drum's surface, assume that the first four functions of the electrophotographic process are functioning (cleaning, conditioning, writing and developing - see Chapter 5), and troubleshoot the failure as a transfer or fusing problem.

If *NO image is present* on the photosensitive drum, perform the following functional checks:

1. Drum Rotation Functional Check.
2. High Voltage Power Supply Check.

Drum Rotation Functional Check

The photosensitive drum, located in the toner cartridge, must rotate for the print process to work. The photosensitive drum receives its drive from the Main Drive assembly. To verify whether the drum is rotating:

1. Open the Front Door.
2. Remove the toner cartridge.
3. Mark the cartridge's drive gear with a felt-tipped marker. Note the position of the mark.
4. Install the toner cartridge, and close the Front Door. The start-up sequence should rotate the drum enough to move the mark.
5. Open the printer, and inspect the gear that was marked in step 3. Verify that the mark moved. If the mark did not move, inspect the Main Drive assembly to ensure that it is meshing with the toner cartridge gears. If the drive gears appear functional, and the drum does not move, replace the toner cartridge.

NOTE This test is especially important if refilled toner cartridges have been used.

High-Voltage Power Supply Check

The High-Voltage Power Supply PCA provides the necessary voltages for the electrophotographic processes. A method for verifying the high-voltage system is given in the table below.

Table 7-20 High Voltage System Checks

CHECKS	ACTION
1. Toner cartridge connection points.	Visually inspect the three connection points on the inside left end of the toner cartridge. If they are dirty or corroded, clean the connections. Clean using alcohol only. If damaged, replace the toner cartridge.
2. High voltage contacts.	The high voltage contact springs mount on the High Voltage Power Supply PCA and protrude through the toner cartridge cavity to contact the toner cartridge. Verify that the contacts are not dirty or corroded, and that the spring action is functional. If dirty, clean using alcohol only; if damaged, replace the High Voltage Power Supply PCA (see Chapter 6 for procedure).

Paper Curl

Paper curl is inherent to the laser printing processes, and occurs when paper is subjected to heat. Paper curl tends to relax as the paper cools while resting on a flat surface. The specification for maximum paper curl when the paper is lying flat before print is 5 mm (0.2 inches).

Although paper curl cannot be totally eliminated, some steps can be taken to lessen its impact, as suggested in the following table.

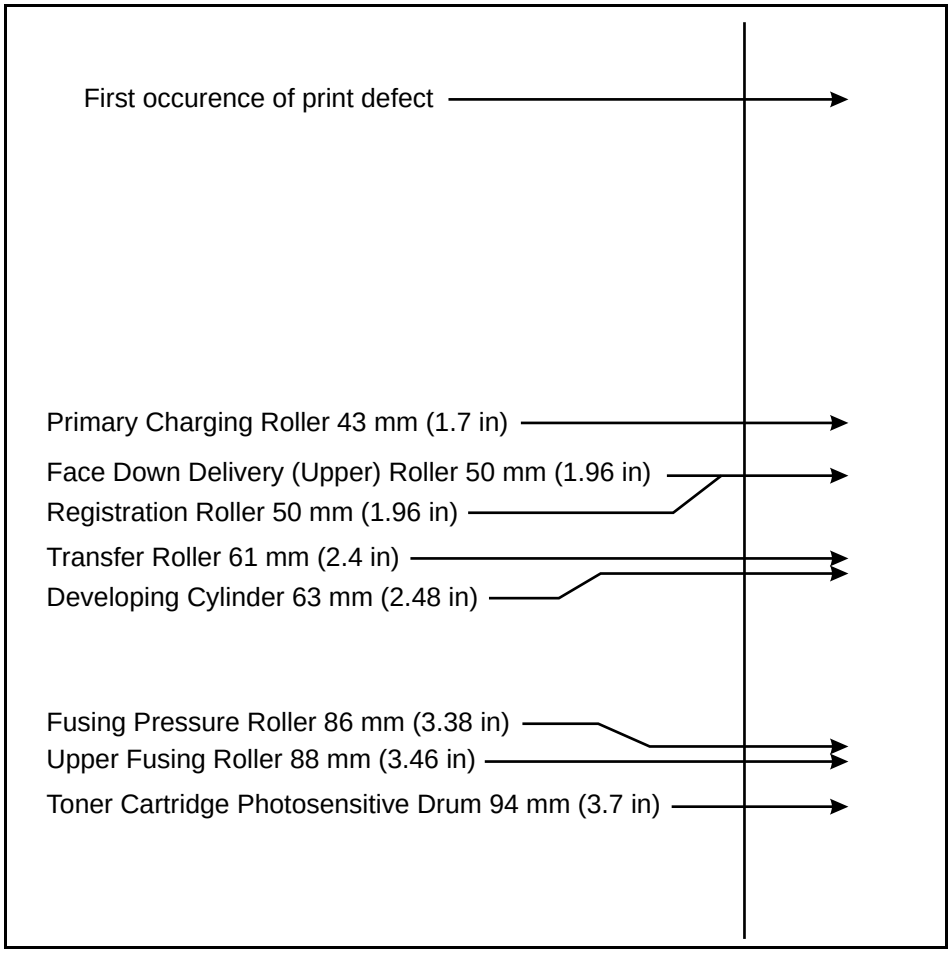
Table 7-21 Causes of Paper Curl

Possible Cause	Recommended Action
1. Paper Path	Try using MP Tray.
2. Paper Surface	The recommended printing surface of the page is usually marked on the end of a ream of paper, indicated by a small arrow and the phrase “print this side first.” Load paper in the Paper Cassette with the recommended **printing surface facing UP** (facing down in the MP Tray).
3. Paper Storing and Handling	Over time, paper assumes the characteristics of its storage environment (in a humid environment, paper absorbs moisture; in a dry environment, paper loses moisture). Paper with higher moisture content will tend to curl more. Evaluate the storage conditions of the paper.
4. Paper Type	All paper is manufactured differently (different textures, moisture content, drying processes, composition, etc.). Change the type of paper being used and re-evaluate the paper curl results.

Troubleshooting Tools

Repetitive Image Defect Ruler

Figure 7-3


First occurence of print defect
Primary Charging Roller 43 mm (1.7 in)
Face Down Delivery (Upper) Roller 50 mm (1.96 in)
Registration Roller 50 mm (1.96 in)
Transfer Roller 61 mm (2.4 in)
Developing Cylinder 63 mm (2.48 in)
Fusing Pressure Roller 86 mm (3.38 in)
Upper Fusing Roller 88 mm (3.46 in)
Toner Cartridge Photosensitive Drum 94 mm (3.7 in)

Repetitive Image Defect Ruler

Wiring Diagrams

This section contains the following diagrams:

Figure 7-4. DC Controller Inputs (1 sheet)

Figure 7-5. DC Controller Outputs (1 of 2)

Figure 7-6. DC Controller Outputs (2 of 2)

Figure 7-7. Main Wiring Diagram (1 sheet, fold-out)

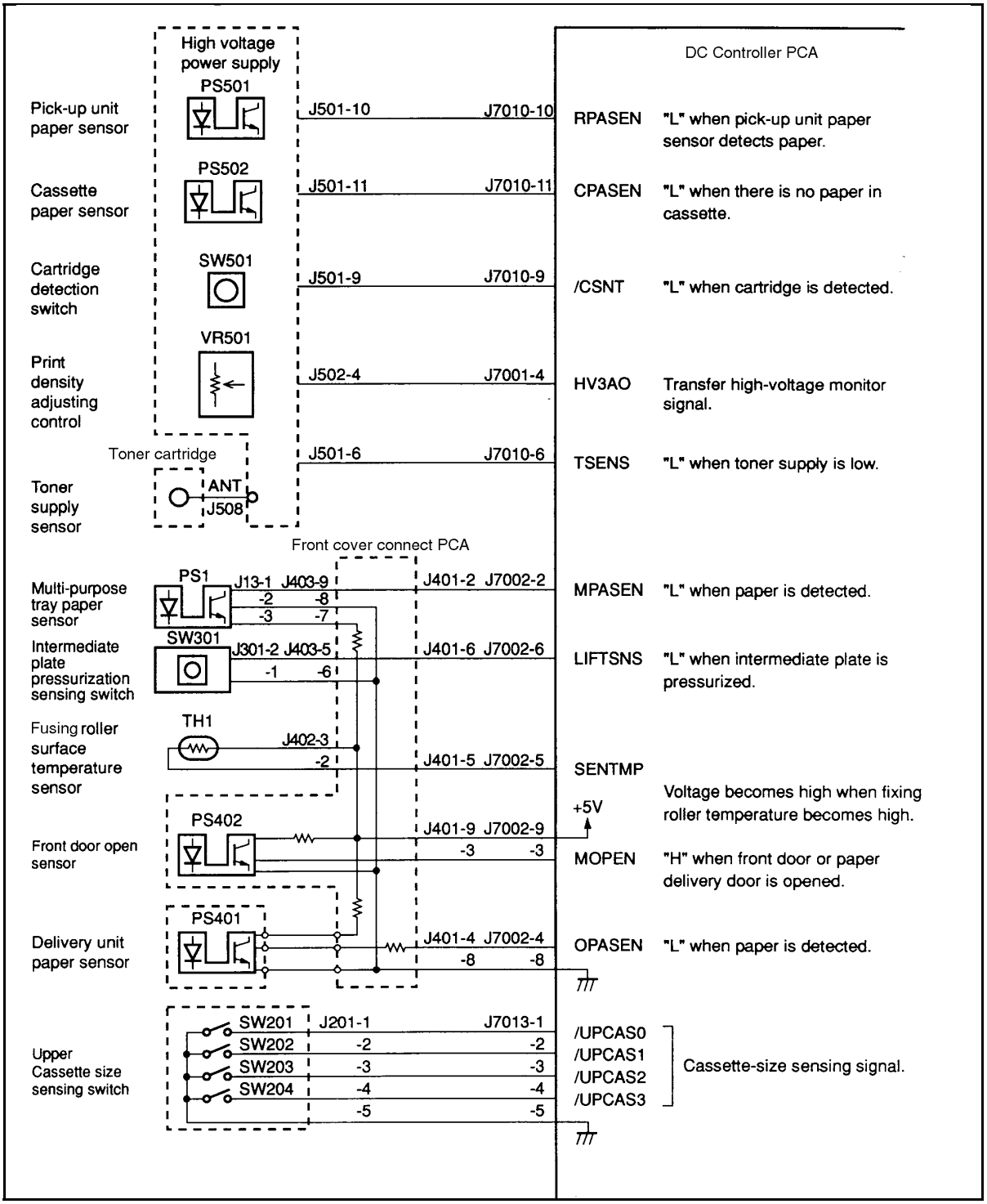


Figure 7-4 DC Controller Inputs

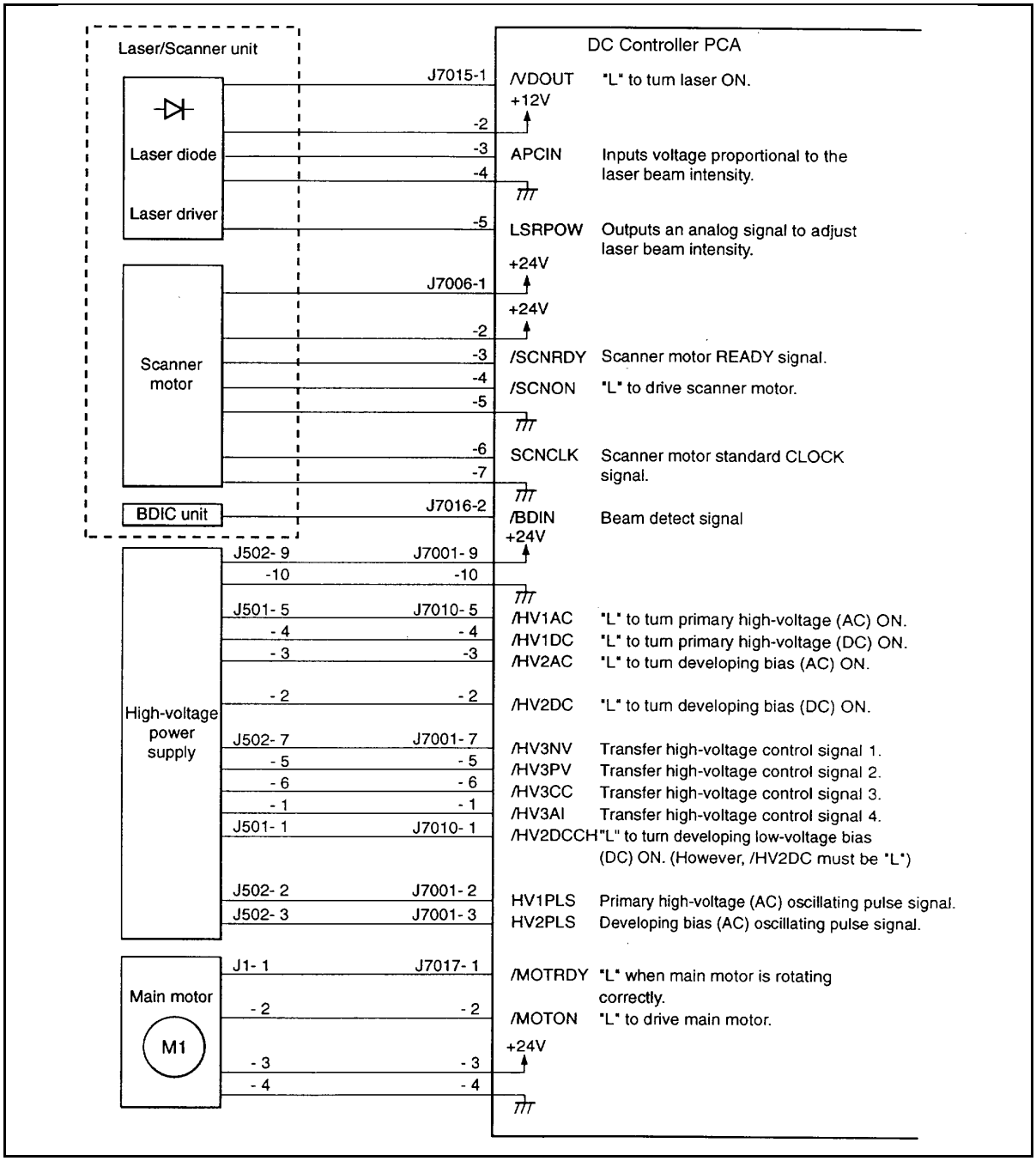


Figure 7-5 DC Controller Outputs (1 of 2)

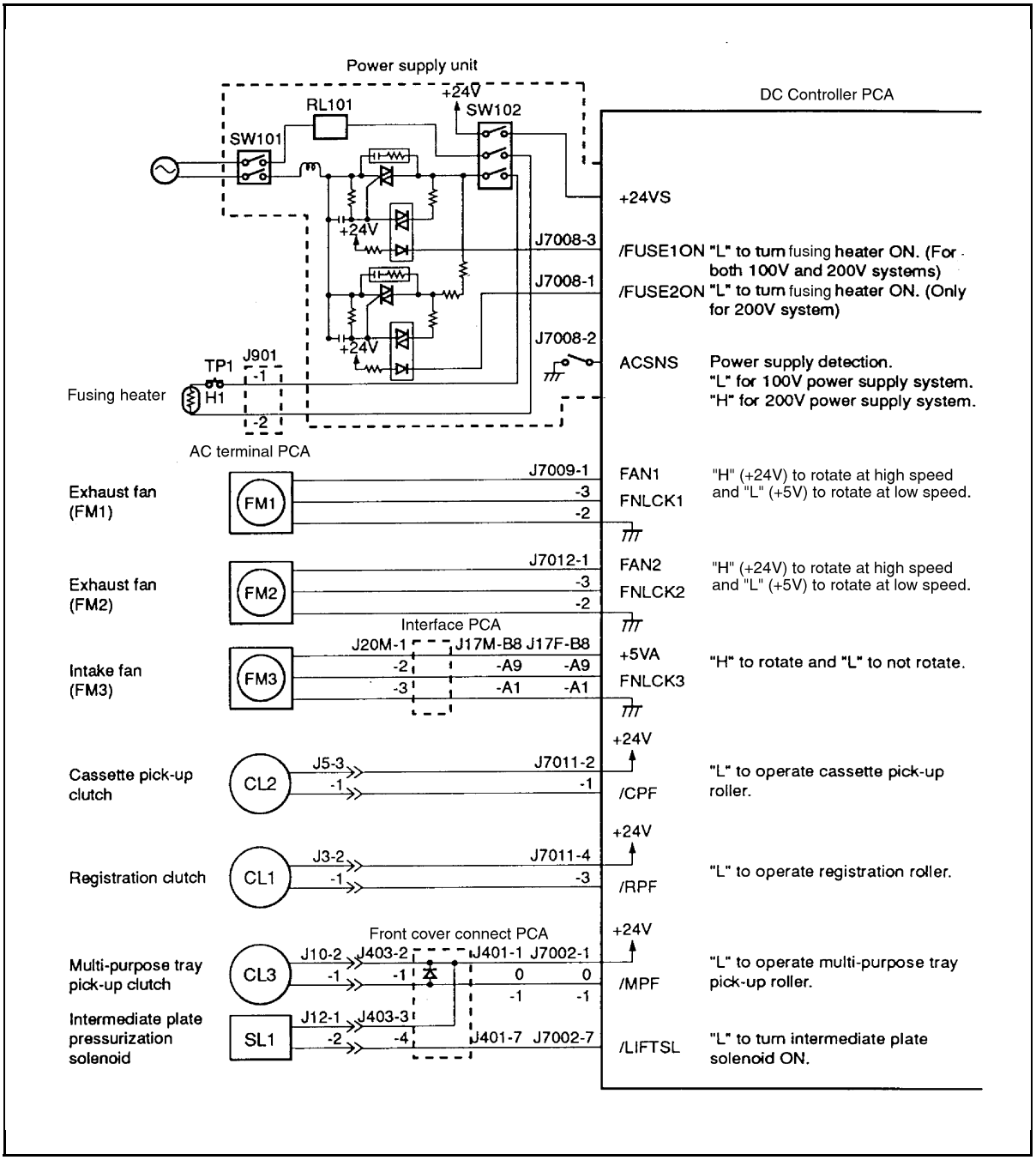


Figure 7-6 DC Controller Outputs (2 of 2)

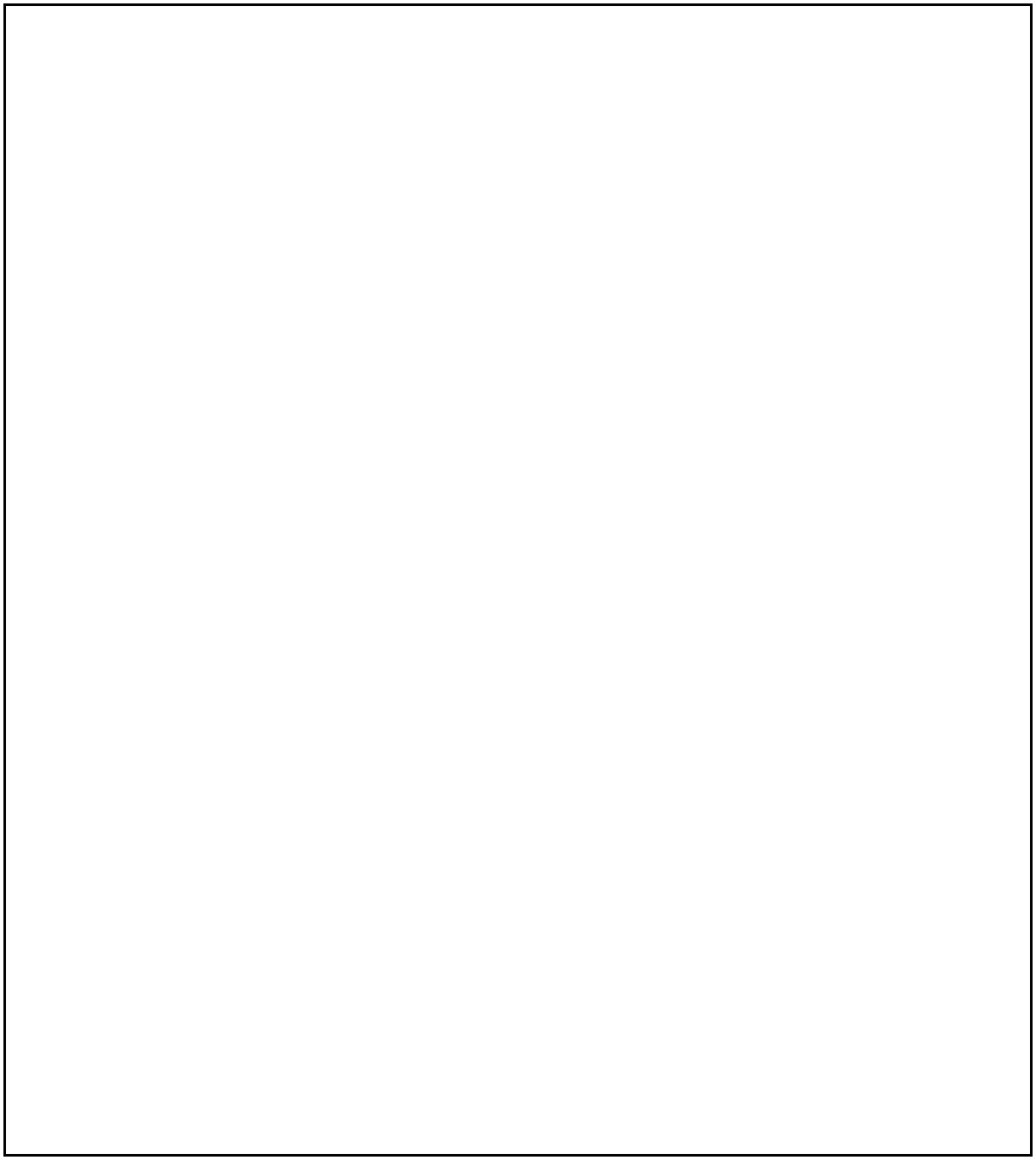


Figure 7-7 Main Wiring Diagram

8

Parts and Diagrams

Chapter Contents

How to Use the Part Lists and Diagrams 8-3
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Ordering Consumables 8-4
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How to Use the Part Lists and Diagrams

The figures in this chapter illustrate the major subassemblies in the printer and their component parts. A table (material list) follows each exploded assembly diagram. Each table lists the reference designator (item number) for each part, the associated part number for the item, the quantity, and a description of the part.

While looking for a part number, pay careful attention to the voltage listed in the description column to ensure that the part number selected is for the correct model of printer.

Ordering Parts

All standard part numbers listed are stocked and may be ordered from HP's Support Materials Organization (SMO), or Support Materials Europe (SME).

Hewlett-Packard Co. Support Materials Organization 8050 Foothills Blvd. Roseville, CA 95678 Parts Direct Ordering: 1-800-227-8164 (U.S. Only)
Hewlett-Packard Co. Support Materials, Europe Wolf-Hirth Strasse 33 D-7030 Böblingen, Germany (49 7031) 14-2253

Contact your local HP Parts Coordinator for other local phone numbers.

Ordering Consumables

Consumables and accessories such as those listed on Table 8-1 may be ordered from Hewlett-Packard.

The phone numbers are:

U.S.: 1-800-538-8787
Canada: 1-800-387-3154
(Toronto) 516-671-8383
United Kingdom: 0734-441212
Germany: 0130-3322

Contact your local HP Parts Coordinator for other local phone numbers.

NOTE Parts that have no reference designator or part number are not field replacement parts and cannot be ordered through SMO.

Accessories and Supplies

The following items are available through your local authorized HP dealer. To find a dealer near you (or if your dealer is temporarily out of stock), call the HP Customer Information Center (800) 752-0900.

NOTE

Refer to "Related Documentation" in Chapter 1 for documentation and training media product numbers.

Table 8-1 Accessories and Supplies

Item	Product Number	Description
Toner Cartridge	C3900A	Replacement toner cartridge.
Memory upgrades	1 MByte - C3130A 2 MByte - C3131A 4 MByte - C3132A 8 MByte - C3133A 16 MByte - C3146A	You can upgrade to a total of 68 MBytes of memory in the HP LaserJet 4V and upgrade to 52 MBytes in the HP LaserJet 4MV.
Adobe's PostScript Level 2	C3160A	You can add Adobe's Level 2 PostScript language by installing this SIMM in your printer. (Additional memory required.) It is standard in the 4MV printer.
250-sheet replacement Paper Cassette	C3160A	250 sheet adjustable between Letter and A4.
	C3161A	250 sheet adjustable between 11x17 and A3.
	C3162A	250 sheets legal only.
	C3163A	250 sheets JIS B4 only.
	C3164A	250 sheets JIS B5 only.
500-sheet Universal Lower Cassette Base Unit (includes 500-sheet paper cassette)	C3760A	500 sheets adjustable for Letter, legal, 11x17, A4, A3, JIS B4. (See Table 8-12 for replacable parts.)
500-sheet replacement paper cassette for Universal Lower Cassette Base	C3761A	
Bi-Tronics Parallel cable	24542D	Bi-Tronics parallel cable.
	C2950A	2 meter, IEEE 1284 compliant.
	C2951A	3 meter, IEEE 1284 compliant.

Table 8-1 Accessories and Supplies - continued

Modular I/O and Network Cards	J2550A	HP JetDirect Multi-protocol Network Card with Ethernet/IEEE802.3 10Base-T
	J2552A	HP JetDirect Multi-protocol Network Card with LocalTalk DIN-8 and Ethernet/IEEE802.3 10Base-T BNC. (Standard in 4MV.)
	J2553A	HP JetDirect Multi-protocol Network Card with Token Ring (DB9 and RJ45).
UNIX Interface Software	J2374B	HP JetDirect interface software for HP-UX systems.
	J2375B	HP JetDirect interface software for SunOS and Solaris UNIX systems.
Disk Accessory	C3295A	42.8 MBytes

Common Hardware and Replaceable Cables

Table 8-A Common Fasteners Used in the Printer

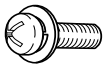
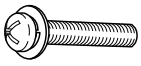
Example	Ref	Description	Part Number
	CH101	Screw, Trus Head, w/Washer	FA9-1449-000
	CH102	Screw, Stepped, M3	RA1-7636-000
	CH103	Screw, Stepped, M3X4	RB1-5489-000
	CH104	Screw, Stepped, M3	RB1-5552-000
	CH105	Screw, w/Washer, M3X8	XA9-0253-000
	CH106	Screw, TP, M3X6	XA9-0267-000
	CH107	Screw, M3X25	XA9-0375-000
	CH108	Screw, BH3X6(S)	XB1-2300-607
	CH109	Screw, Mach, Trus Head M3X8	XB1-2302-507
	CH110	Screw, Machine M4X8	XB1-2400-809
	CH111	Screw, Tap Binding Head M4X8	XB4-7400-809
	CH112	Screw, Pan Head Self-tap	XB4-7401-007
	CH113	Screw, Bind Head Self-tap	XB4-7401-009

Table 8-A Common Fasteners Used in the Printer - continued

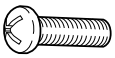
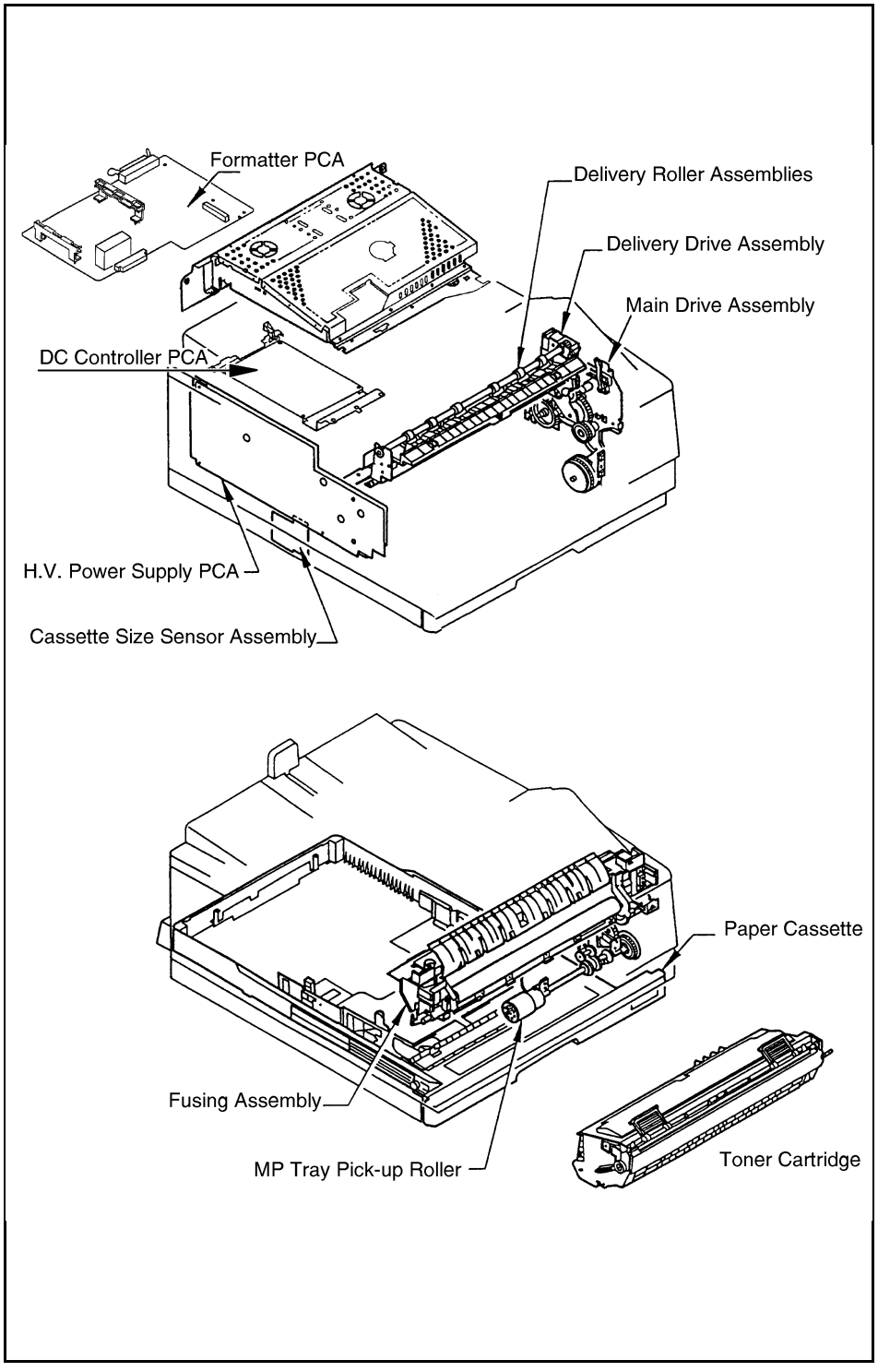
Example	Ref	Description	Part Number
	CH114	Screw, Machine M3X8	XB6-7300-809
	CH115	Screw, TP, M3X16	XB6-7301-609
	CH116	Retaining Ring (e-type)	XD2-1100-242
	CH117	Retaining Ring (e-type)	XD2-1100-322
	CH118	Retaining Ring (e-type)	XD2-1100-402
	CH119	Retaining Ring (e-type)	XD2-1100-502
	CH120	Retaining Ring (e-type)	XD2-1100-642
	CH121	Retaining Ring (e-type)	XG9-0260-000
	CH122	Screw, Mach, M3X14	XB1-2301-407

Table 8-B Replaceable Cables

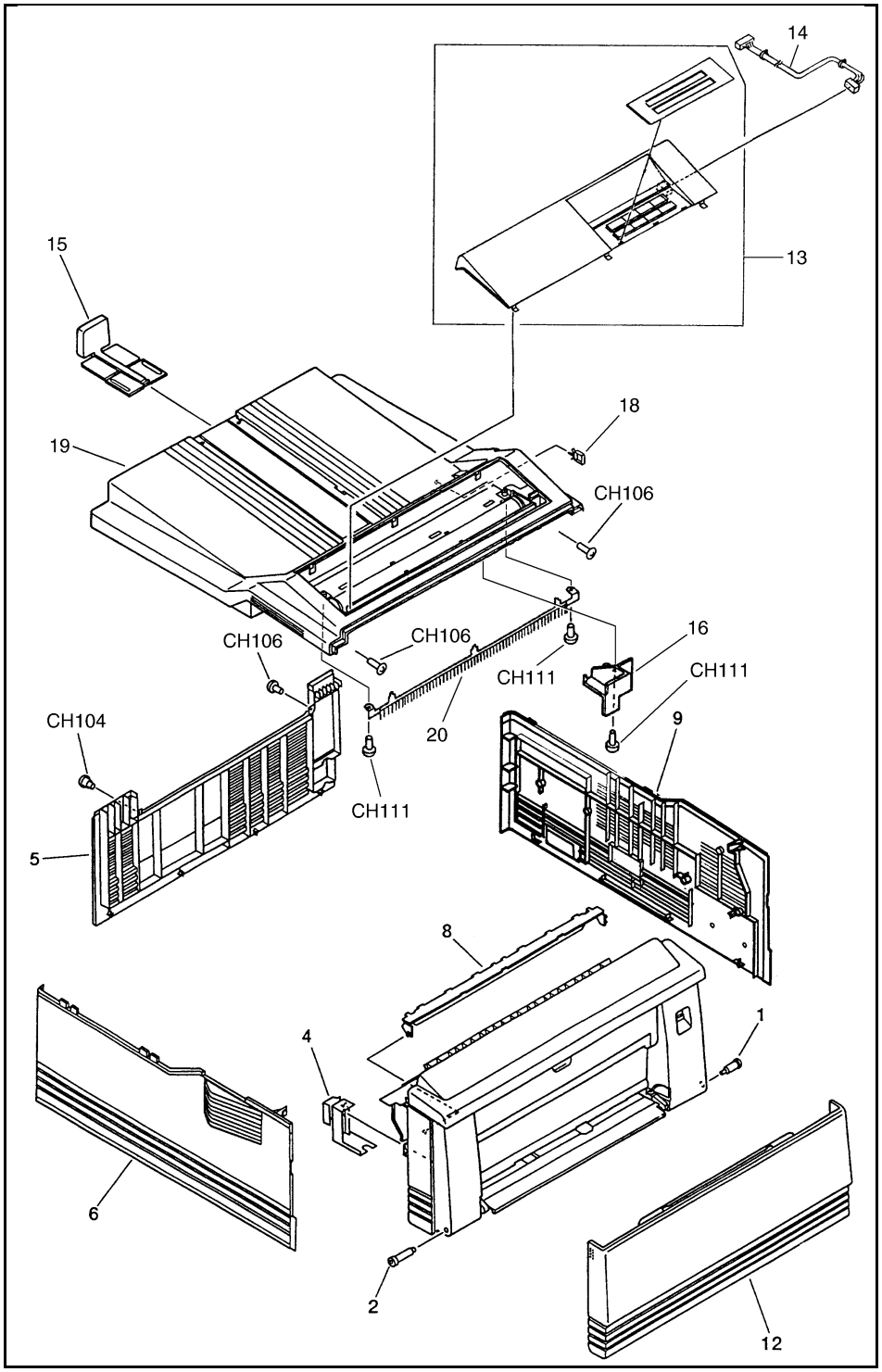
Description	Part No.	Fig	Ref
Cable, Beam Detect	RG5-1442-000	8-9	10
Option Cable Assembly	RG5-1446-000	8-3	11B
Clutch Cable	RG5-1447-000	8-8	18
DC Cable Assembly	RG5-0239-000	8-8	17
Display Panel Cable Assembly	RG5-1485-000	8-2	14

Figure 8-1



Major Assembly Locations

Figure 8-2

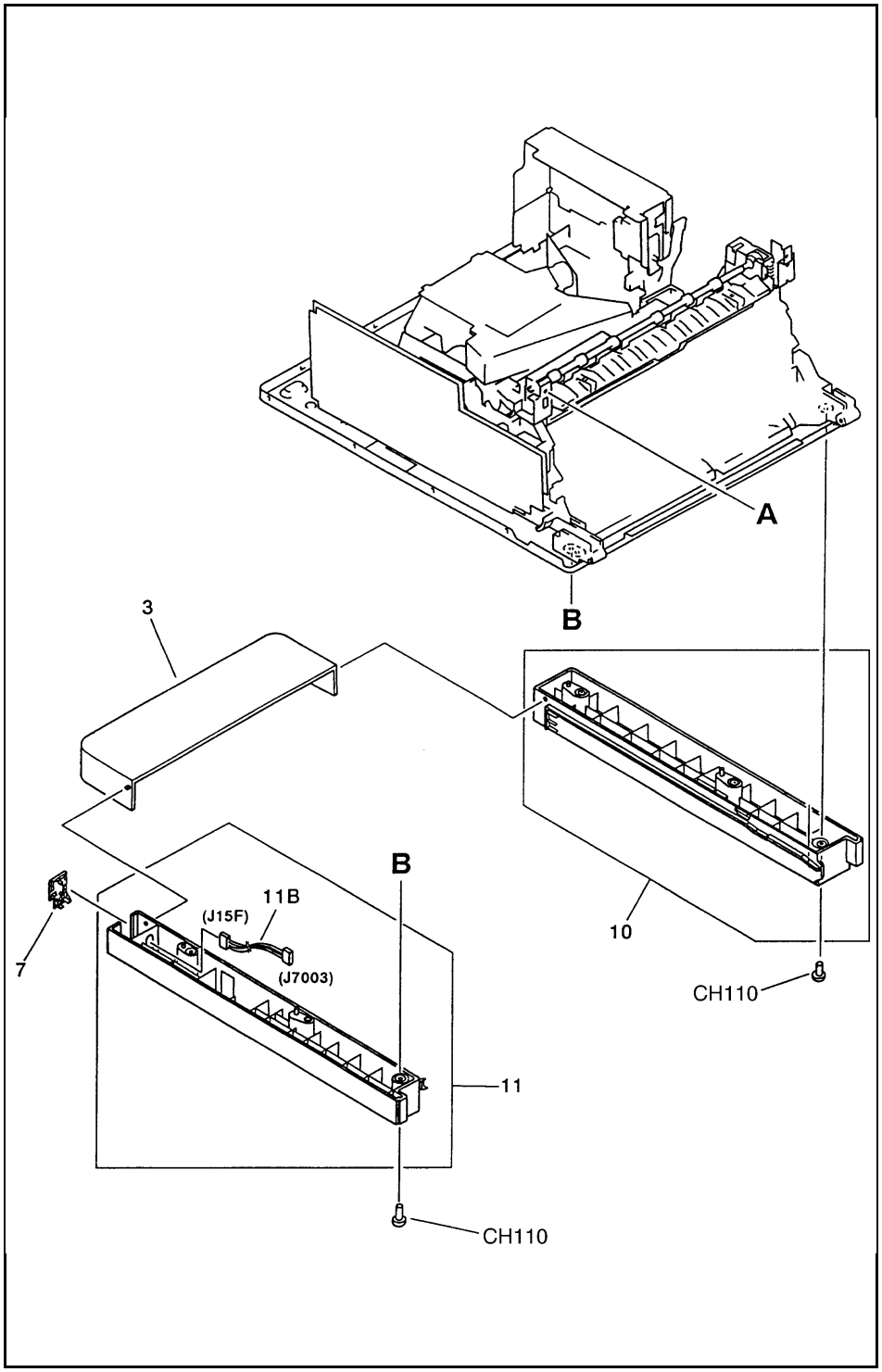


Covers and Doors

Table 8-2 Covers and Doors

Ref	Part No.	Qty	Description
1	RA2-0448-000	1	Pivot
2	RB1-1291-000	1	Shaft, 2
4	RB1-1421-000	1	Cover
5	RB1-5562-000	1	Panel, Rear
6	RB1-5563-000	1	Panel, Left
8	RF5-1141-000	1	Guide, Plate, Protection
9	RF5-1166-000	1	Panel, Right
12	RG5-1562-000	1	Multi-purpose Tray Assembly 100/115V
12	RG5-1563-000	1	Multi-purpose Tray Assembly 220/240V
13	RG5-1539-000	1	Display Panel Assembly 100/115V
13	RG5-1540-000	1	Display Panel Assembly 220/240V
14	RG5-1485-000	1	Display Panel Cable Assembly
15	RF5-1173-000	1	Slider
16	RB1-1336-000	1	Cover, Cable
18	WT2-5018-000	2	Clip, Cable
19	RG5-1541-000	1	Upper Cover Assembly
20	RB1-5467-000	1	Eliminator, Static Charge
CH104	RB1-5552-000	1	Screw, Stepped, M3
CH106	XA9-0267-000	1	Screw, TP, M3X6
CH111	XB4-7400-809	7	Screw, Tapping, Truss Head

Figure 8-3

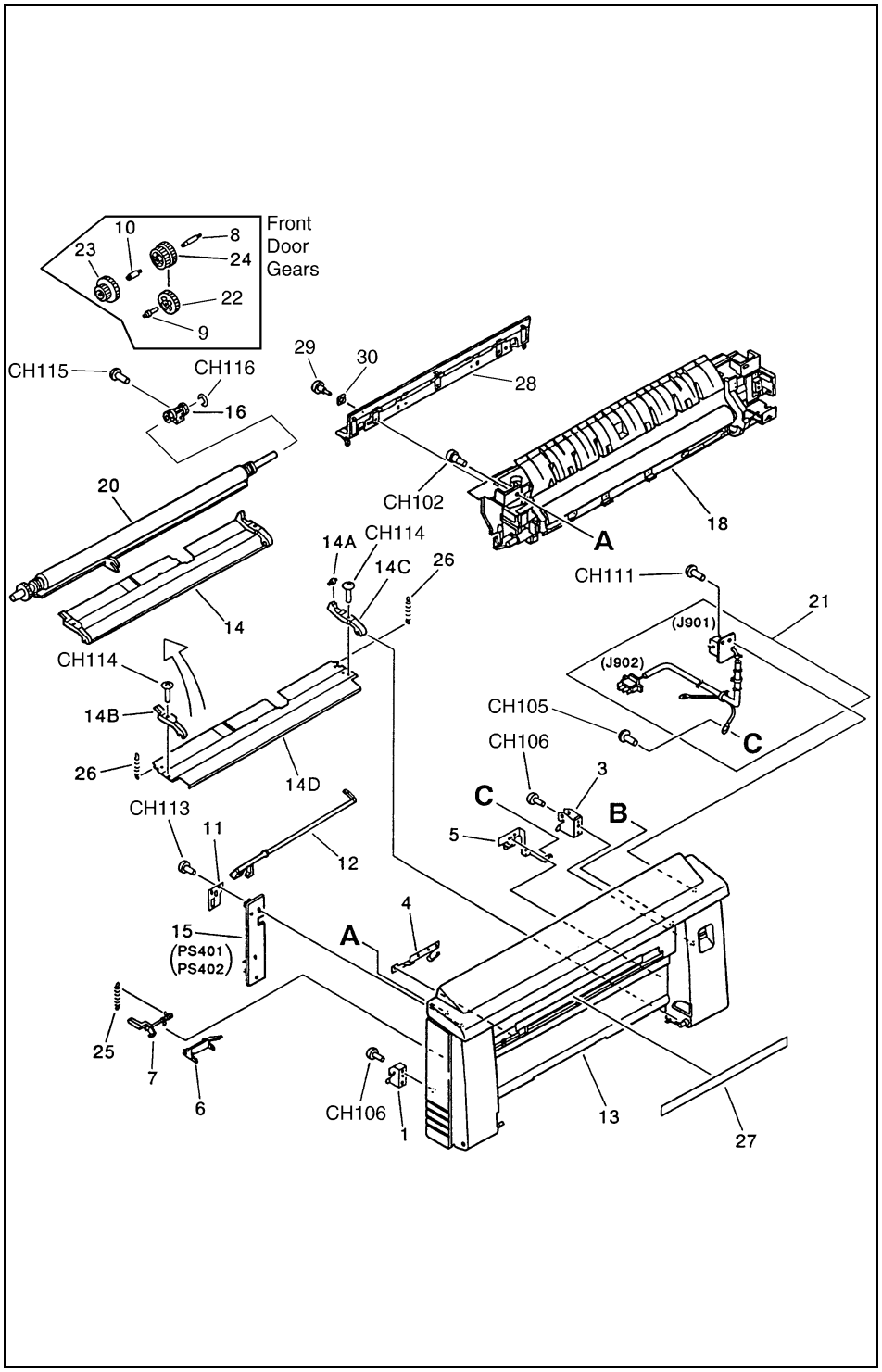


Foot Assemblies

Table 8-3 Foot Assemblies

Ref	Part No.	Qty	Description
3	RB1-5575-000	1	Cover, Rear Cassette
7	RF5-1176-000	1	Plate, Cover
10	RG5-1550-000	1	Right Foot Assembly
11	RG5-1551-000	1	Left Foot Assembly
CH110	XB1-2400-809	1	Screw, Machine M4X8
11B	RG5-1446-000	1	Option Cable Assembly

Figure 8-4

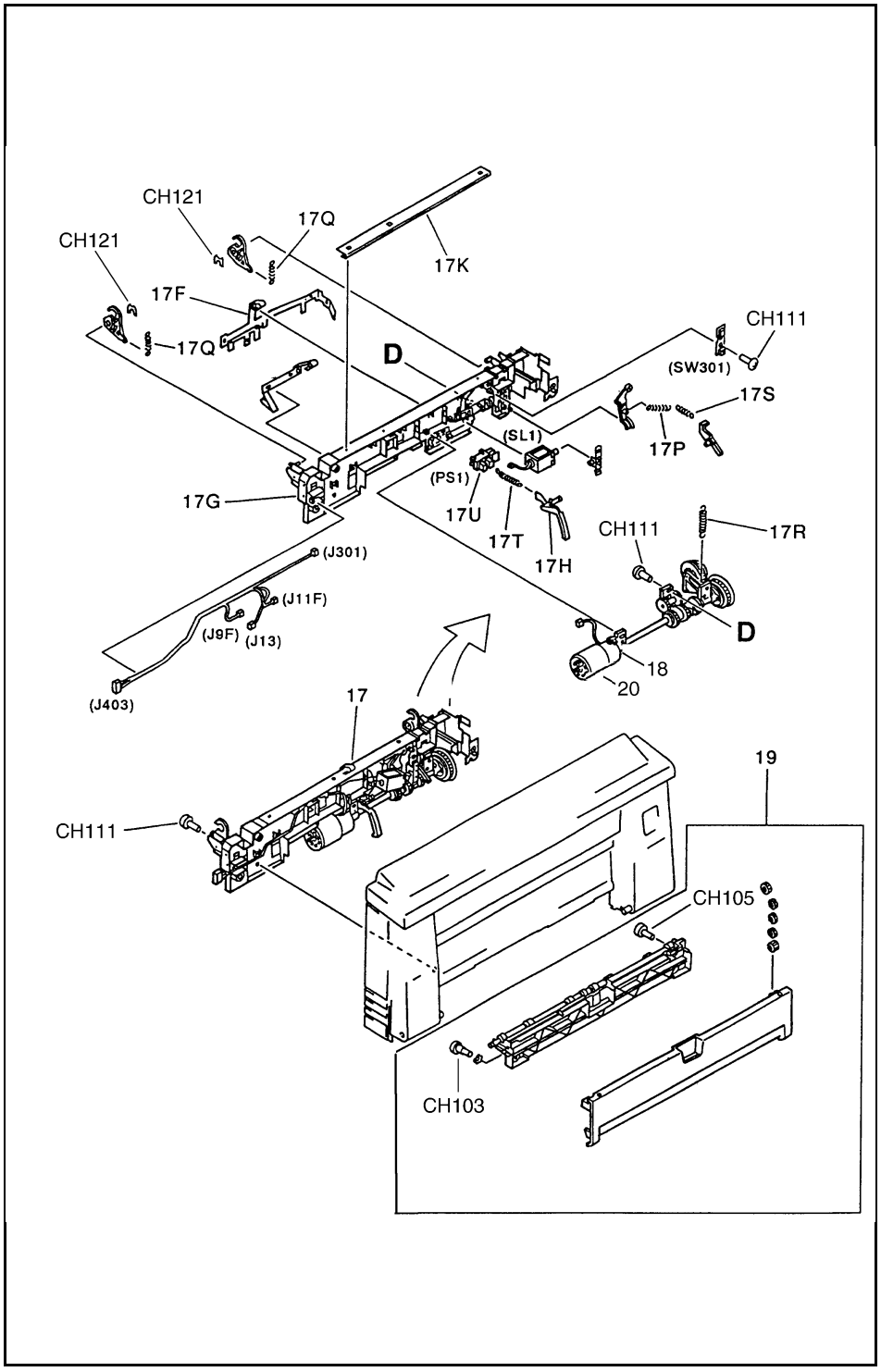


Front Door Components (Page 1 of 2)

Table 8-4 Front Door Components (1 of 2)

Ref	Part No.	Qty	Description
1	RA1-7563-000	1	Mount
3	RA2-0418-000	1	Mount, Rod
4	RB1-1399-000	1	Plate, Continuity, 1
5	RB1-1400-000	1	Plate, Continuity, 2
6	RB1-1438-000	1	Lever, Sensor, A
7	RA2-0420-000	1	Lever, Door Sensing, B
8	RB1-1422-000	1	Shaft, Gear, A
9	RB1-1423-000	1	Shaft, Gear, B
10	RB1-1424-000	1	Shaft, Gear, C
11	RB1-1429-000	1	Guide, Connector
12	RF5-0400-000	1	Lever, Sensor, Delivery
13	RF5-1165-000	1	Cover, Front
14	RG5-0209-000	1	Paper Guide Plate Assembly
15	RG5-0231-000	1	Front Cover Connect PCA Assembly
16	RG5-0505-000	1	Delivery Drive Assembly
18	RG5-1420-000	1	Fusing Assembly 100/115V
18	RG5-1406-000	1	Fusing Assembly 220/240V
18	C3141-69002	1	Exchange Fusing Assembly 100/115V
18	C3141-69001	1	Exchange Fusing Assembly 220/240V
20	RG5-1410-000	1	Transfer Roller Holder Assembly
21	RG5-1417-000	1	AC Terminal PCA Assembly
22	RS5-0186-000	1	Gear, 34T
23	RS5-0187-000	1	Gear, 21T/40T
24	RS5-0576-000	1	Gear, 25T/33T
25	RS5-2125-000	1	Spring, Tension
26	RS5-2128-000	2	Spring, Tension
27	RS5-8128-000	1	Label, Caution, High Temp
28	RF5-1150-000	1	Guide, Entrance
29	RA1-7636-000	3	Screw, Stepped M3
30	XD9-0079-000	2	Washer, Wave
CH102	RA1-7636-000	1	Screw, Stepped, M3
CH105	XA9-0253-000	1	Screw, W/Washer, M3X8
CH106	XA9-0267-000	1	Screw, TP, M3X6
CH113	XB4-7401-009	1	Screw, Bind Head Self-tap
CH114	XB6-7300-809	1	Screw, Machine M3X8
CH115	XB6-7301-609	1	Screw, TP, M3X16
CH116	XD2-1100-242	1	Retaining Ring (e-type)

Figure 8-5

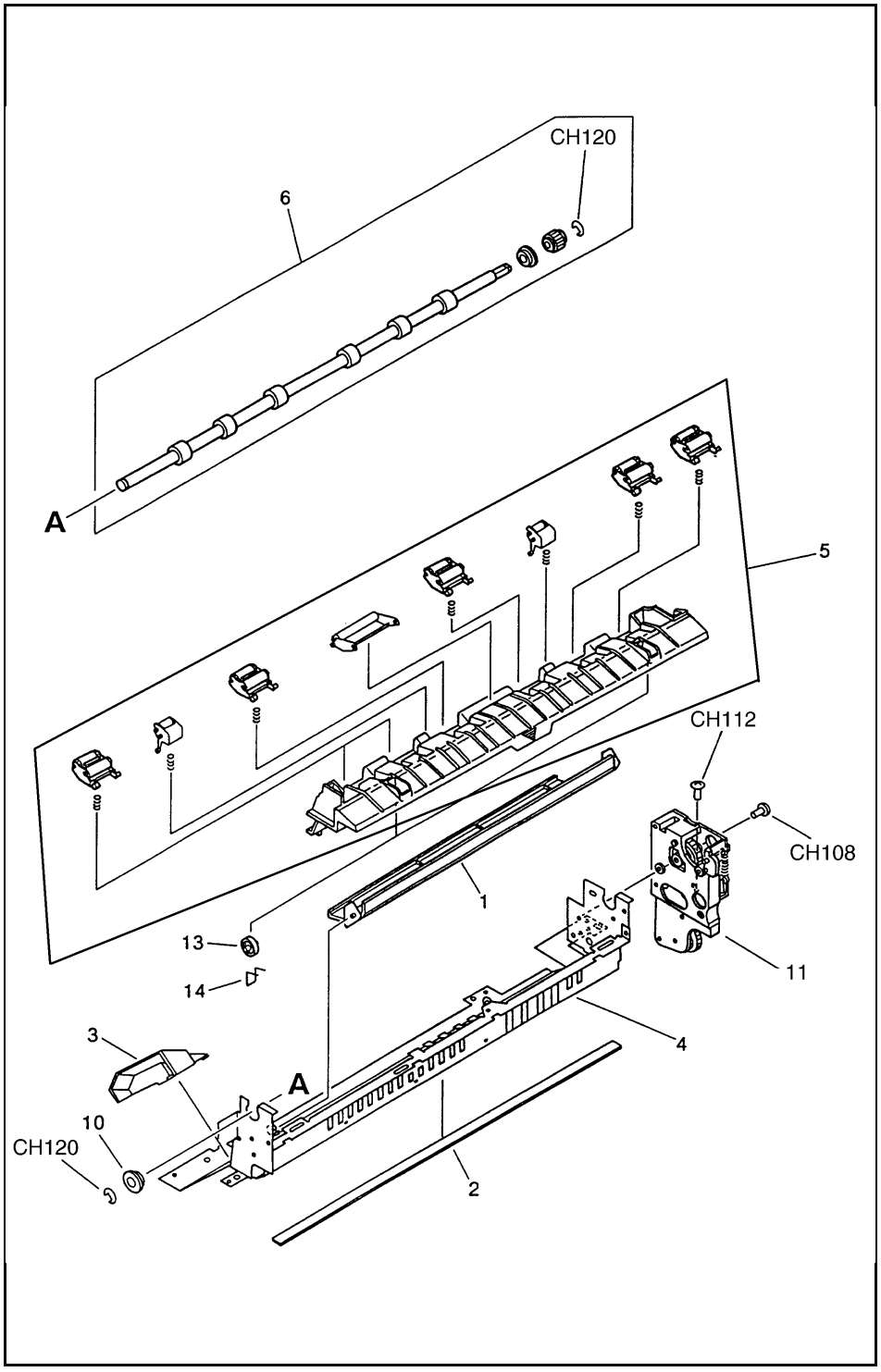


Front Door Components (Page 2 of 2)

Table 8-5 Front Door Components (2 of 2)

Ref	Part No.	Qty	Description
17	RG5-1404-000	1	Paper Guide Plate Assembly
19	RG5-1552-000	1	Front Door Assembly
20	RB1-1411-000	1	Roller, Pickup
CH103	RB1-5489-000	1	Screw, Stepped, M3X4
CH105	XA9-0253-000	1	Screw, W/Washer, M3X8
CH111	XB4-7400-809	2	Screw, Tap Binding Head M4X8
CH121	XG9-0260-000	1	Retaining Ring (e-type)
17P	RS1-2342-000	1	Spring, Tension
17Q	RS5-2118-000	2	Spring, Tension
17R	RS5-2122-000	1	Spring, Tension
17S	RS5-2126-000	1	Spring, Tension
17T	RS5-2129-000	1	Spring, Tension

Figure 8-6

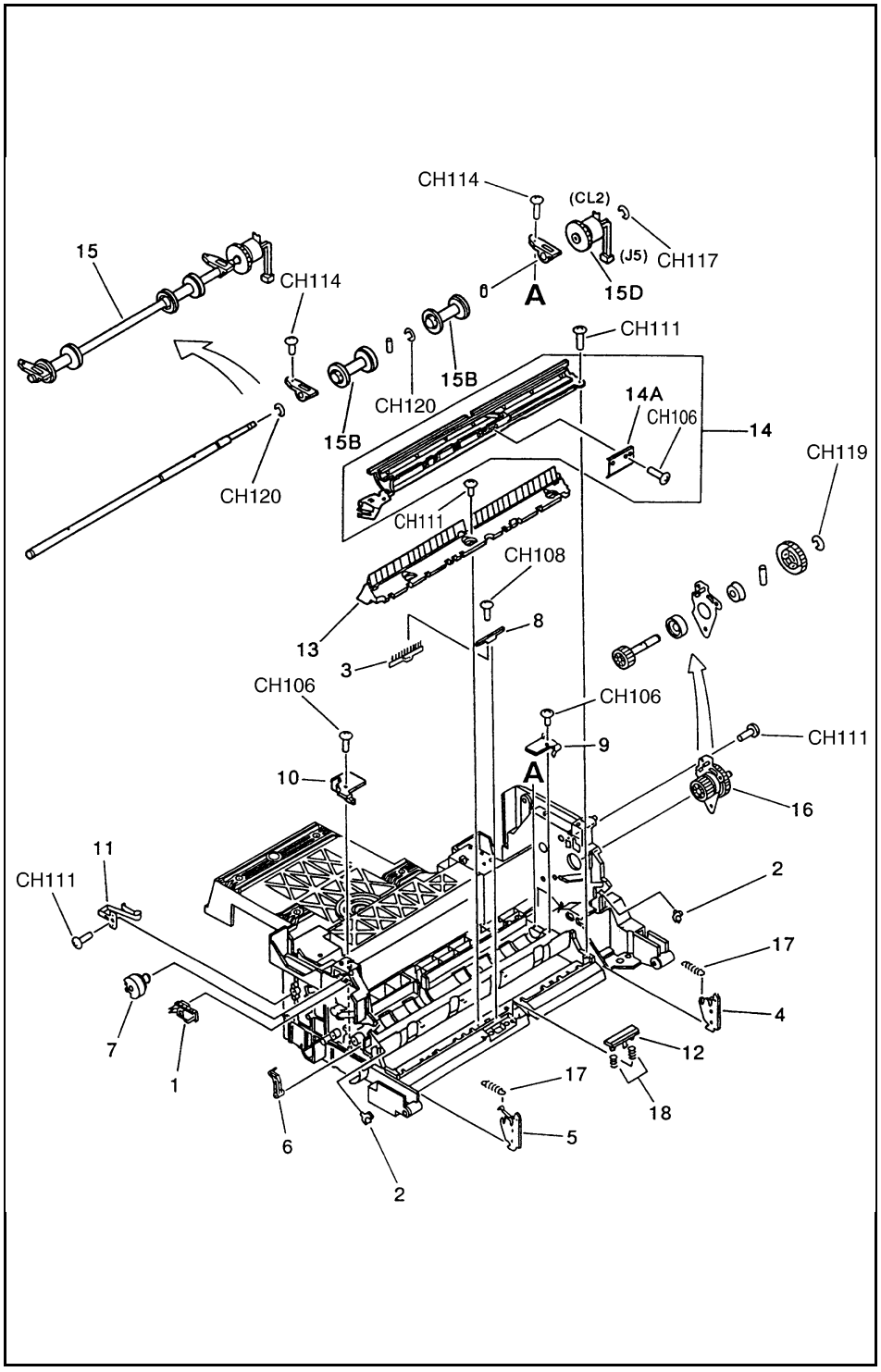


Output Components

Table 8-6 Output Components

Ref	Part No.	Qty	Description
1	RB1-1352-040	1	Shutter, Laser
2	RB1-5457-000	1	Cover, Louver
3	RB1-5459-000	1	Pad, Shutter
4	RB1-5460-000	1	Cover, Center
5	RG5-1545-000	1	Guide, Delivery Unit
6	RG5-0198-000	1	Face Down Delivery Assembly
7	RG5-0200-000	6	FD Roller Assembly
10	RS5-1004-000	1	Bushing
11	RG5-1396-000	1	Gear Mounting Assembly
CH108	XB1-2300-607	1	Screw, BH3X6(S)
CH112	XB4-7401-007	1	Screw, Pan Head Self-tap
CH120	XD2-1100-642	2	Retaining Ring (e-type)

Figure 8-7

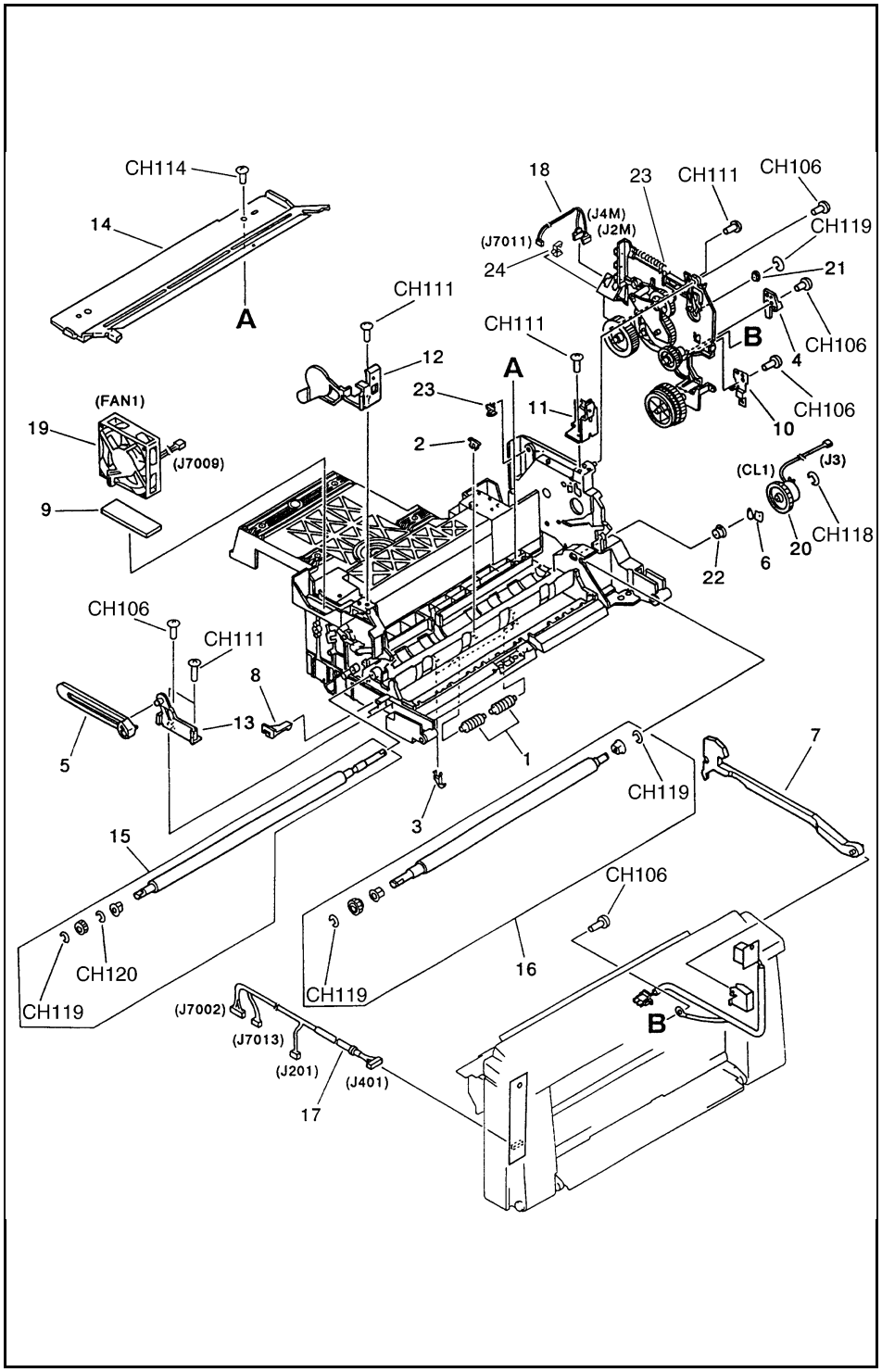


Internal Components (Page 1 of 4)

Table 8-7 Internal Components (1 of 4)

Ref	Part No.	Qty	Description
1	RA2-0298-000	1	Rack
2	RA2-0321-000	1	Bushing
3	RB1-1274-000	1	Eliminator, Static Charge
4	RB1-1317-000	1	Plate, Pressure, Right
5	RB1-1318-000	1	Plate, Pressure, Left
6	RB1-1324-000	1	Lever
7	RB1-1343-000	1	Knob, Print Density
8	RB1-1344-000	1	Bracket, Anti-static Brush
9	RB1-1349-000	1	Hook, Right
10	RB1-1350-000	1	Hook, Left
11	RB1-5454-000	1	Spring, Leaf
12	RF5-0302-000	1	Separation Pad
13	RF5-0395-000	1	Guide, Paper
14	RF5-0396-000	1	Guide
15	RG5-1391-000	1	Pickup Roller Assembly
15B	RB1-1386-000	2	Roller, Pickup
15D	RH7-5095-000	1	Clutch, Electromagnetic
16	RG5-1399-000	1	Drum Drive Assembly
17	RS5-2117-000	2	Spring, Tension
18	RS5-2123-000	2	Spring, Compression
CH106	XA9-0267-000	2	Screw, TP, M3X6
CH108	XB1-2300-607	1	Screw, BH3X6(S)
CH111	XB4-7400-809	1	Screw, Tap Binding Head M4X8
CH114	XB6-7300-809	1	Screw, Machine M3X8
CH117	XD2-1100-322	1	Retaining Ring (e-type)
CH119	XD2-1100-502	1	Retaining Ring (e-type)
CH120	XD2-1100-642	1	Retaining Ring (e-type)

Figure 8-8

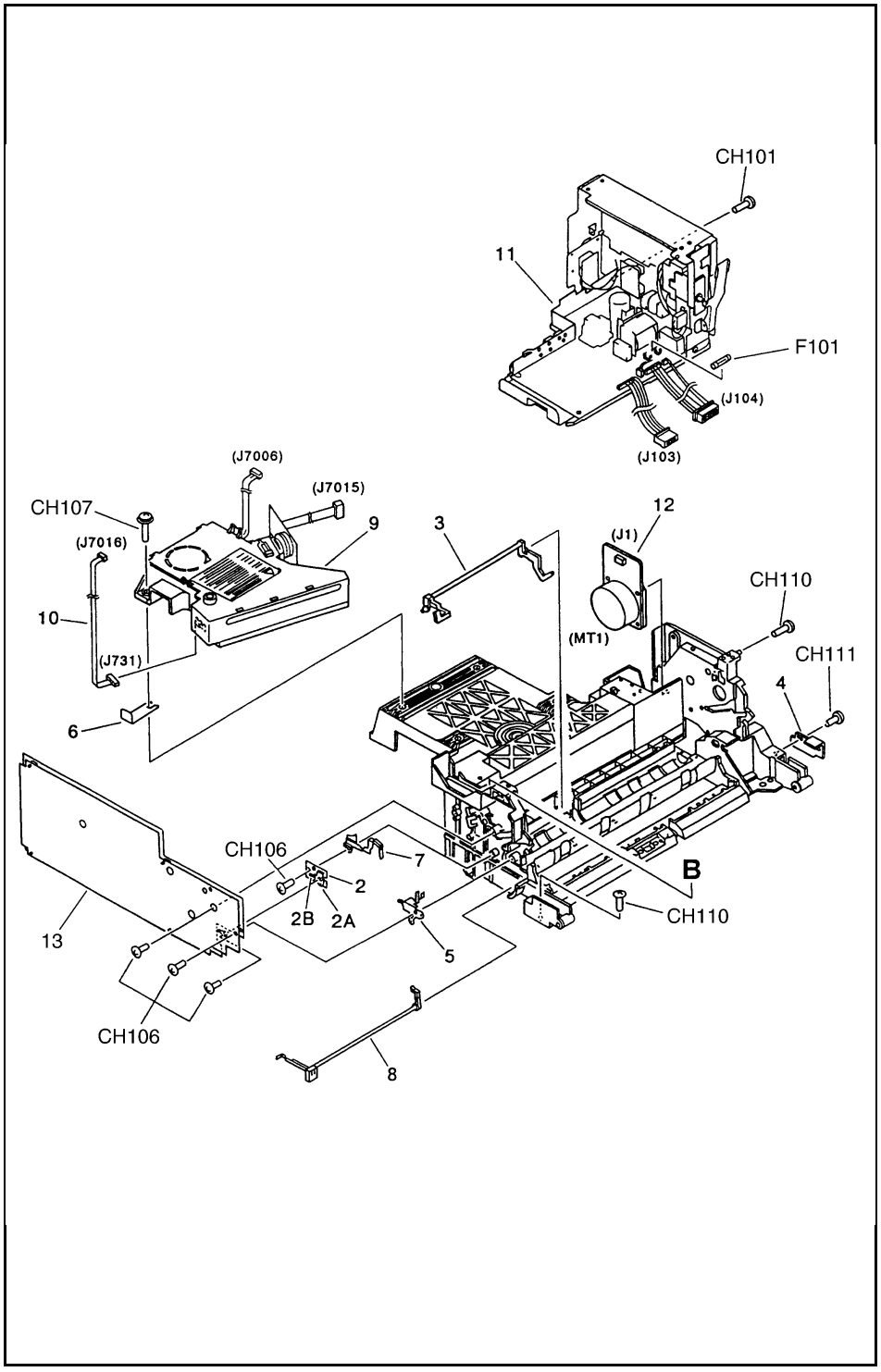


Internal Components (Page 2 of 4)

Table 8-8 Internal Components (2 of 4)

Ref	Part No.	Qty	Description
1	RA2-0308-000	2	Roller, Guide
2	RA2-0311-000	1	Bushing, Sensor
3	RA2-0312-000	2	Claw
4	RB1-1292-000	1	Plate, Stop, Clutch, R
5	RB1-1294-000	1	Rod, Left
6	RB1-1367-000	1	Retainer
7	RB1-1385-000	1	Rod
8	RB1-2748-000	1	Stopper, Registration
10	RB1-5442-000	1	Plate, Stop, Clutch
11	RB1-5445-000	1	Plate, Mounting, Right
12	RB1-5490-000	1	Plate, Mounting, Left
13	RF5-0331-000	1	Plate, Rod, Left
14	RF5-1142-000	1	Guide, Cartridge
15	RG5-0194-000	1	Registration Roller Assembly, Metal
16	RG5-0195-000	1	Registration Roller Assembly, Rubber
17	RG5-0239-000	1	DC Cable Assembly
18	RG5-1447-000	1	Clutch Cable
19	RH7-1126-000	1	Fan (FM1)
20	RH7-5094-000	1	Clutch, Electromagnetic
21	RS5-1058-000	1	Bushing
22	RS5-1147-000	1	Bushing
23	RG5-1398-000	1	Main Drive Assembly
24	WT2-0388-000	5	Clip, Cable
CH106	XA9-0267-000	1	Screw, TP, M3X6
CH111	XB4-7400-809	1	Screw, Tap Binding Head M4X8
CH114	XB6-7300-809	1	Screw, Machine M3X8
CH118	XD2-1100-402	1	Retaining Ring (e-type)
CH119	XD2-1100-502	3	Retaining Ring (e-type)
CH120	XD2-1100-642	1	Retaining Ring (e-type)

Figure 8-9

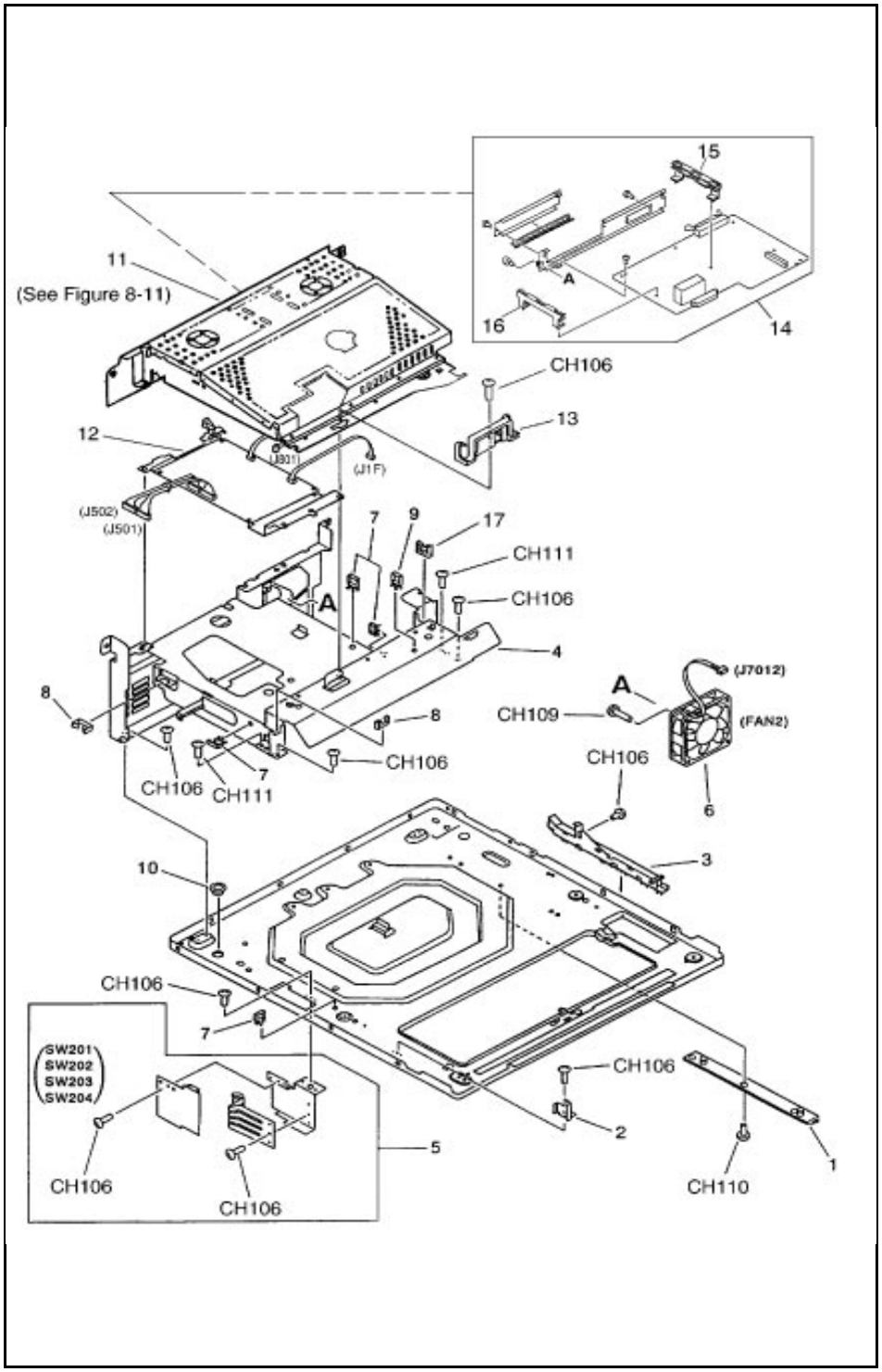


Internal Components (Page 3 of 4)

Table 8-9 Internal Components (3 of 4)

Ref	Part No.	Qty	Description
2	FG2-4647-000	1	Sub Transfer Assembly
3	RB1-1278-000	1	Lever, Paper Sensing
4	RB1-1286-000	1	Cover, E
5	RB1-1325-000	1	Plate
7	RF5-0326-000	1	Plate, Contact Transfer
8	RF5-0397-000	1	Lever, Sensor, Front, Reg
9	RG5-1383-000	1	Laser/Scanner Assembly
10	RG5-1442-000	1	Cable, Beam Detect
11	RH3-2150-000	1	Power Supply Assembly 100/115V
11	RH3-2151-000	1	Power Supply Assembly 220/240V
12	RH7-1199-000	1	Motor, DC 17.5W
13	RG5-1435-000	1	HV Power Supply Assembly
CH101	FA9-1449-000	1	Screw, Truss Head, w/Washer
CH106	XA9-0267-000	1	Screw, TP, M3X6
CH107	XA9-0375-000	1	Screw, M3X25
CH110	XB1-2400-809	1	Screw, Machine M4X8
CH111	XB4-7400-809	1	Screw, Tap Binding HeaD M4X8
F101	WD1-0224-000	1	Fuse, 125V, 6.3A
F101	WD1-0643-151	1	Fuse, 250V, 3.15A

Figure 8-10

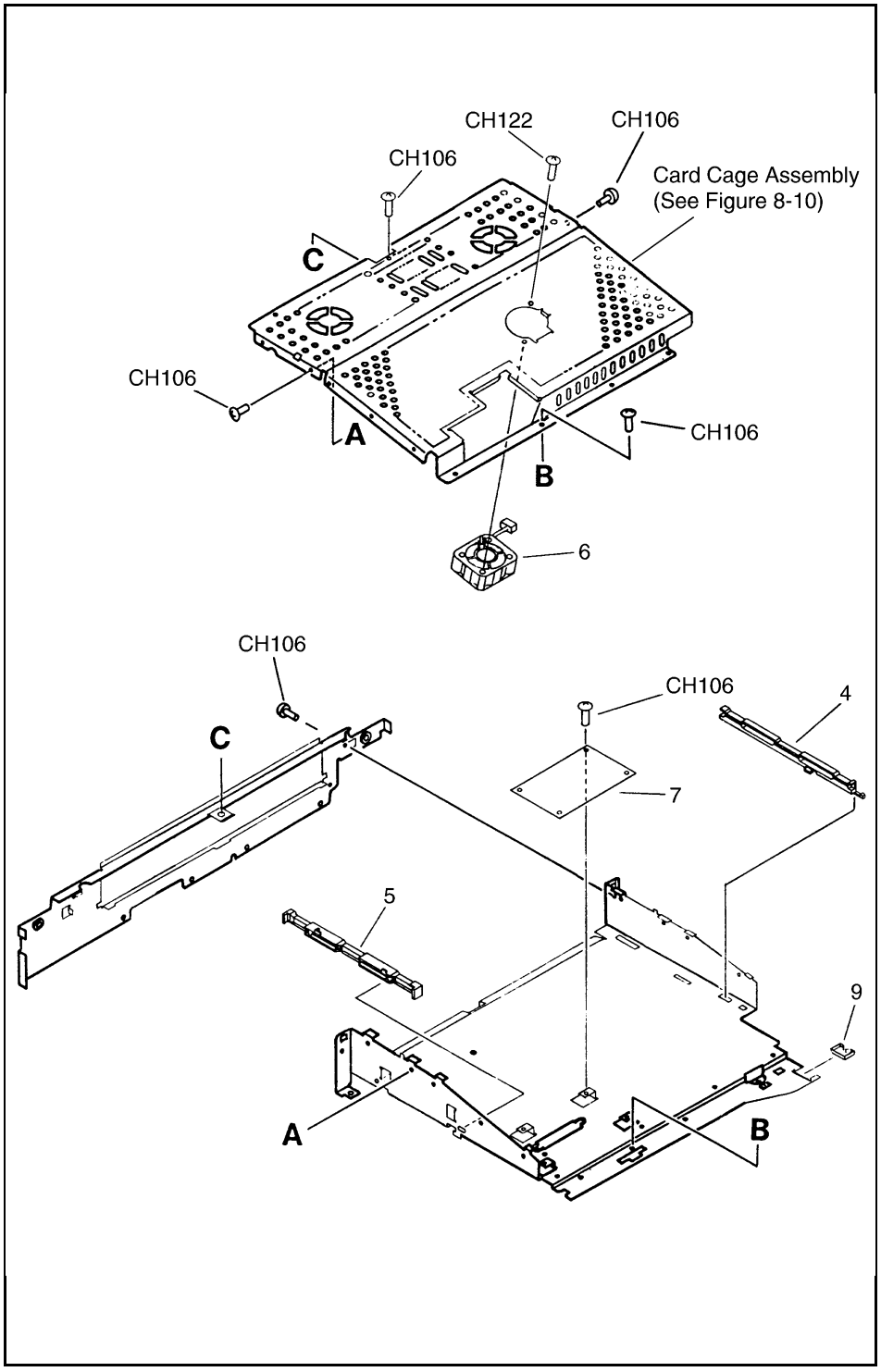


Internal Components (Page 4 of 4)

Table 8-10 Internal Components (4 of 4)

Ref	Part No.	Qty	Description
1	RB1-1273-000	1	Guide, Cassette
2	RB1-1346-000	1	Plate, HVT
3	RB1-1380-020	1	Bracket, Cable
4	RB1-5446-000	1	Plate, Rear Shield
5	RG5-1416-000	1	Cass Size Sensor Assembly
6	RH7-1214-000	1	Fan (FM2)
7	WT2-0317-000	4	Clip, Cable
8	WT2-5011-000	2	Clip, Cable
9	WT2-5018-000	1	Clip, Cable
10	WT2-5114-000	1	Bushing
11	RG5-1560-000	1	Card Cage Assembly
12	RG5-1559-000	1	DC Controller PCA Assembly
12	C3141-69003	1	Exchange DC Controller PCA Assembly
13	RB1-5559-000	1	Clamp, Cable
14	C3143-67901	1	Formatter PCA
14	C3143-69001	1	Exchange Formatter PCA
15	RB1-5786-000	1	MIO Cover Plate
16	RB1-5789-000	2	MIO Guide Rail
17	WT2-9501-000	1	Holder, Cable
CH106	XA9-0267-000	2	Screw, TP, M3X6
CH109	XB1-2302-507	1	Screw, Mach, Trus Head M3X25
CH110	XB1-2400-809	1	Screw, Machine M4X8
CH111	XB4-7400-809	1	Screw, Tap Binding Head M4X8

Figure 8-11



Card Cage Assembly

Table 8-11 Card Cage Assembly

Ref	Part No.	Qty	Description
4	RB1-5557-000	1	Rail, Slide, Right
5	RB1-5558-000	1	Rail, Slide, Left
6	RH7-1218-000	1	Fan (FM3)
7	RG5-1484-000	1	Small Interface PCA
CH106	XA9-0267-000	6	Screw, TP, M3X6
CH122	XB1-2301-407	1	Screw, Mach, Trus Head M3X14

Table 8-12 Optional Lower Cassette Assembly

Ref	Part No.	Qty	Description
N/A	C3760-60001	1	Lower Cassette Assembly
N/A	C3760-69001	1	Exchange Lower Cassette Assembly
N/A	C3760-60503	1	Lower Cassette Paper Guide
N/A	C3760-60502	1	Lower Cassette Paper Tray
N/A	C3760-60501	1	Lower Cassette Pickup Roller

A

Parts Index

Alphabetical Parts Index

Table A-1 Alphabetical Parts List

Description	Part No.	Fig	Ref
AC Terminal PCA Assembly	RG5-1417-000	8-4	21
Bracket, Anti-static Brush	RB1-1344-000	8-7	8
Bracket, Cable	RB1-1380-020	8-10	3
Bushing	RA2-0321-000	8-7	2
Bushing	RS5-1004-000	8-6	10
Bushing	RS5-1058-000	8-8	21
Bushing	RS5-1147-000	8-8	22
Bushing	WT2-5114-000	8-10	10
Bushing, Sensor	RA2-0311-000	8-8	2
Cable, Beam Detect	RG5-1442-000	8-9	10
Card Cage Assembly	RG5-1560-000	8-10	11
Cass Size Sensor Assembly	RG5-1416-000	8-10	5
Clamp, Cable	RB1-5559-000	8-10	13
Claw	RA2-0312-000	8-8	3
Clip, Cable	WT2-5018-000	8-2	18
Clip, Cable	WT2-0317-000	8-10	7
Clip, Cable	WT2-0388-000	8-8	24
Clip, Cable	WT2-5011-000	8-10	8
Clip, Cable	WT2-5018-000	8-10	9
Clutch Cable	RG5-1447-000	8-8	18
Clutch, Electromagnetic	RH7-5094-000	8-8	20
Clutch, Electromagnetic	RH7-5095-000	8-7	15D
Cover	RB1-1421-000	8-2	4
Cover, Cable	RB1-1336-000	8-2	16
Cover, Center	RB1-5460-000	8-6	4
Cover, E	RB1-1286-000	8-9	4
Cover, Front	RF5-1165-000	8-4	13
Cover, Louver	RB1-5457-000	8-6	2

Table A-1 Alphabetical Parts List - continued

Description	Part No.	Fig	Ref
Cover, Rear Cassette	RB1-5575-000	8-3	3
DC Cable Assembly	RG5-0239-000	8-8	17
DC Controller PCA Assembly	RG5-1559-000	8-10	12
Delivery Drive Assembly	RG5-0505-000	8-4	16
Display Panel Assembly 100/115V	RG5-1539-000	8-2	13
Display Panel Assembly 220/240V	RG5-1540-000	8-2	13
Display Panel Cable Assembly	RG5-1485-000	8-2	14
Drum Drive Assembly	RG5-1399-000	8-7	16
Eliminator, Static Charge	RB1-1274-000	8-7	3
Eliminator, Static Charge	RB1-5467-000	8-2	20
Exchange DC Controller PCA Assembly	C3141-69003	8-10	12
Exchange Formatter PCA Assembly	C3143-69001	8-10	14
Exchange Fusing Assembly 100/115V	C3141-69002	8-4	18
Exchange Fusing Assembly 220/240V	C3141-69001	8-4	18
Exchange Lower Cassette Assembly	C3760-69001	8-12	N/A
Face Down Delivery Assembly	RG5-0198-000	8-6	6
Fan (FM1)	RH7-1126-000	8-8	19
Fan (FM2)	RH7-1214-000	8-10	6
Fan (FM3)	RH7-1218-000	8-11	6
FD Roller Assembly	RG5-0200-000	8-6	7
Formatter PCA	C3143-67901	8-10	14
Front Cover Connect PCA Assembly	RG5-0231-000	8-4	15
Front Door Assembly	RG5-1552-000	8-5	19
Fuse, 125V, 6.3A	WD1-0224-000	8-9	F101
Fuse, 250V, 3.15A	WD1-0643-151	8-9	F101
Fusing Assembly 100/115V	RG5-1420-000	8-4	18
Fusing Assembly 220/240V	RG5-1406-000	8-4	18
Gear Mounting Assembly	RG5-1396-000	8-6	11
Gear, 21T/40T	RS5-0187-000	8-4	23
Gear, 25T/33T	RS5-0576-000	8-4	24

Table A-1 Alphabetical Parts List - continued

Description	Part No.	Fig	Ref
Gear, 34T	RS5-0186-000	8-4	22
Guide	RF5-0396-000	8-7	14
Guide, Cartridge	RF5-1142-000	8-8	14
Guide, Cassette	RB1-1273-000	8-10	1
Guide, Connector	RB1-1429-000	8-4	11
Guide, Delivery Unit	RG5-1545-000	8-6	5
Guide, Entrance	RF5-1150-000	8-4	28
Guide, Paper	RF5-0395-000	8-7	13
Guide, Plate, Protection	RF5-1141-000	8-2	8
Holder, Cable	WT2-9501-000	8-10	17
Hook, Left	RB1-1350-000	8-7	10
Hook, Right	RB1-1349-000	8-7	9
HV Power Supply Assembly	RG5-1435-000	8-9	13
Knob, Print Density	RB1-1343-000	8-7	7
Label, Caution, High Temp	RS5-8128-000	8-4	27
Laser/Scanner Assembly	RG5-1383-000	8-9	9
Left Foot Assembly	RG5-1551-000	8-3	11
Lever	RB1-1324-000	8-7	6
Lever, Door Sensing, B	RA2-0420-000	8-4	7
Lever, Paper Sensing	RB1-1278-000	8-9	3
Lever, Sensor, A	RB1-1438-000	8-4	6
Lever, Sensor, Delivery	RF5-0400-000	8-4	12
Lever, Sensor, Front, REG	RF5-0397-000	8-9	8
Lower Cassette Assembly	C3760-60001	8-12	N/A
Lower Cassette Paper Guide	C3760-60503	8-12	N/A
Lower Cassette Paper Tray	C3760-60502	8-12	N/A
Lower Cassette Pickup Roller	C3760-60501	8-12	N/A
Main Drive Assembly	RG5-1398-000	8-8	23
MIO Cover Plate	RB1-5786-000	8-10	15
MIO Guide Rail	RB1-5789-000	8-10	16

Table A-1 Alphabetical Parts List - continued

Description	Part No.	Fig	Ref
Motor, DC 17.5W	RH7-1199-000	8-9	12
Mount	RA1-7563-000	8-4	1
Mount, Rod	RA2-0418-000	8-4	3
Multi-purpose Tray Assembly 100/115V	RG5-1562-000	8-2	12
Multi-purpose Tray Assembly 220/240V	RG5-1563-000	8-2	12
Option Cable Assembly	RG5-1446-000	8-3	11B
Pad, Separation	RF5-0302-000	8-7	12
Pad, Shutter	RB1-5459-000	8-6	3
Panel, Left	RB1-5563-000	8-2	6
Panel, Rear	RB1-5562-000	8-2	5
Panel, Right	RF5-1166-000	8-2	9
Paper Guide Plate Assembly	RG5-0209-000	8-4	14
Paper Guide Plate Assembly	RG5-1404-000	8-5	17
Pickup Roller Assembly	RG5-1391-000	8-7	15
Pivot	RA2-0448-000	8-2	1
Plate	RB1-1325-000	8-9	5
Plate, Contact Transfer	RF5-0326-000	8-9	7
Plate, Continuity, 1	RB1-1399-000	8-4	4
Plate, Continuity, 2	RB1-1400-000	8-4	5
Plate, Cover	RF5-1176-000	8-3	7
Plate, HVT	RB1-1346-000	8-10	2
Plate, Mounting, Left	RB1-5490-000	8-8	12
Plate, Mounting, Right	RB1-5445-000	8-8	11
Plate, Pressure, Left	RB1-1318-000	8-7	5
Plate, Pressure, Right	RB1-1317-000	8-7	4
Plate, Rear Shield	RB1-5446-000	8-10	4
Plate, Rod, Left	RF5-0331-000	8-8	13
Plate, Stop, Clutch	RB1-5442-000	8-8	10
Plate, Stop, Clutch, R	RB1-1292-000	8-8	4
Power Supply Assembly 100/115V	RH3-2150-000	8-9	11

Table A-1 Alphabetical Parts List - continued

Description	Part No.	Fig	Ref
Power Supply Assembly 220/240V	RH3-2151-000	8-9	11
Rack	RA2-0298-000	8-7	1
Rail, Slide, Left	RB1-5558-000	8-11	5
Rail, Slide, Right	RB1-5557-000	8-11	4
Registration Roller Assembly, Metal	RG5-0194-000	8-8	15
Registration Roller Assembly, Rubber	RG5-0195-000	8-8	16
Retainer	RB1-1367-000	8-8	6
Retaining Ring (e-type)	XD2-1100-242	8-4	116
Retaining Ring (e-type)	XD2-1100-322	8-7	117
Retaining Ring (e-type)	XD2-1100-402	8-8	118
Retaining Ring (e-type)	XD2-1100-502	8-7	119
Retaining Ring (e-type)	XD2-1100-502	8-8	119
Retaining Ring (e-type)	XD2-1100-642	8-6	120
Retaining Ring (e-type)	XD2-1100-642	8-7	120
Retaining Ring (e-type)	XD2-1100-642	8-8	120
Retaining Ring (e-type)	XG9-0260-000	8-5	121
Right Foot Assembly	RG5-1550-000	8-3	10
Rod	RB1-1385-000	8-8	7
Rod, Left	RB1-1294-000	8-8	5
Roller, Guide	RA2-0308-000	8-8	1
Roller, Pickup	RB1-1411-000	8-5	20
Roller, Pickup	RB1-1386-000	8-7	15B
Screw, BH3X6(S)	XB1-2300-607	8-6	108
Screw, BH3X6(S)	XB1-2300-607	8-7	108
Screw, Bind Head Self-tap	XB4-7401-009	8-4	113
Screw, M3X25	XA9-0375-000	8-9	107
Screw, Machine, Trus Head M3X14	XB1-2301-407	8-11	122
Screw, Machine, Trus Head M3X25	XB1-2302-507	8-10	109
Screw, Machine M3X8	XB6-7300-809	8-4	114
Screw, Machine M3X8	XB6-7300-809	8-7	114

Table A-1 Alphabetical Parts List - continued

Description	Part No.	Fig	Ref
Screw, Machine M3X8	XB6-7300-809	8-8	114
Screw, Machine M4X8	XB1-2400-809	8-3	110
Screw, Machine M4X8	XB1-2400-809	8-9	110
Screw, Machine M4X8	XB1-2400-809	8-10	110
Screw, Pan Head Self-tap	XB4-7401-007	8-6	112
Screw, Stepped M3	RA1-7636-000	8-4	29
Screw, Stepped, M3	RA1-7636-000	8-4	102
Screw, Stepped, M3	RB1-5552-000	8-2	104
Screw, Stepped, M3X4	RB1-5489-000	8-5	103
Screw, Tap Binding Head M4X8	XB4-7400-809	8-5	111
Screw, Tap Binding Head M4X8	XB4-7400-809	8-7	111
Screw, Tap Binding Head M4X8	XB4-7400-809	8-8	111
Screw, Tap Binding Head M4X8	XB4-7400-809	8-9	111
Screw, Tap Binding Head M4X8	XB4-7400-809	8-10	111
Screw, Tapping, Trus Head	XB4-7400-809	8-2	CH111
Screw, TP, M3X16	XB6-7301-609	8-4	115
Screw, TP, M3X6	XA9-0267-000	8-2	106
Screw, TP, M3X6	XA9-0267-000	8-4	106
Screw, TP, M3X6	XA9-0267-000	8-7	106
Screw, TP, M3X6	XA9-0267-000	8-8	106
Screw, TP, M3X6	XA9-0267-000	8-9	106
Screw, TP, M3X6	XA9-0267-000	8-10	106
Screw, TP, M3X6	XA9-0267-000	8-11	106
Screw, Trus Head, w/washer	FA9-1449-000	8-9	101
Screw, w/washer, M3X8	XA9-0253-000	8-4	105
Screw, w/washer, M3X8	XA9-0253-000	8-5	105
Shaft, 2	RB1-1291-000	8-2	2
Shaft, Gear, A	RB1-1422-000	8-4	8
Shaft, Gear, B	RB1-1423-000	8-4	9
Shaft, Gear, C	RB1-1424-000	8-4	10

Table A-1 Alphabetical Parts List - continued

Description	Part No.	Fig	Ref
Shutter, Laser	RB1-1352-040	8-6	1
Slider	RF5-1173-000	8-2	15
Small Interface PCA	RG5-1484-000	8-11	7
Spring, Compression	RS5-2123-000	8-7	18
Spring, Leaf	RB1-5454-000	8-7	11
Spring, Tension	RS1-2342-000	8-5	17P
Spring, Tension	RS5-2117-000	8-7	17
Spring, Tension	RS5-2118-000	8-5	17Q
Spring, Tension	RS5-2122-000	8-5	17R
Spring, Tension	RS5-2125-000	8-4	25
Spring, Tension	RS5-2126-000	8-5	17S
Spring, Tension	RS5-2128-000	8-4	26
Spring, Tension	RS5-2129-000	8-5	17T
Springs, Separation Pad	RS5-2123-000	8-7	18
Stopper, Registration	RB1-2748-000	8-8	8
Sub Transfer Assembly	FG2-4647-000	8-9	2
Transfer Roller Holder Assembly	RG5-1410-000	8-4	20
Upper Cover Assembly	RG5-1541-000	8-2	19
Washer, Wave	XD9-0079-000	8-4	30

Numerical Parts Index

Table A-2 Numerical Parts List

Part No.	Description	Fig	Ref
C3141-69001	Exchange Fusing Assembly 220/240V	8-4	18
C3141-69002	Exchange Fusing Assembly 100/115V	8-4	18
C3141-69003	Exchange DC Controller PCA Assembly	8-10	12
C3143-67901	Formatter PCA	8-10	14
C3143-69001	Exchange Formatter PCA	8-10	14
C3760-60001	Lower Cassette Assembly	8-12	N/A
C3760-60501	Lower Cassette Pickup Roller	8-12	N/A
C3760-60502	Lower Cassette Paper Tray	8-12	N/A
C3760-60503	Lower Cassette Paper Guide	8-12	N/A
C3760-69001	Exchange Lower Cassette Assembly	8-12	N/A
FA9-1449-000	Screw, Trus Head, w/washer	8-9	101
FG2-4647-000	Sub Transfer Assembly	8-9	2
RA1-7563-000	Mount	8-4	1
RA1-7636-000	Screw, Stepped M3	8-4	29
RA1-7636-000	Screw, Stepped, M3	8-4	102
RA2-0298-000	Rack	8-7	1
RA2-0308-000	Roller, Guide	8-8	1
RA2-0311-000	Bushing, Sensor	8-8	2
RA2-0312-000	Claw	8-8	3
RA2-0321-000	Bushing	8-7	2
RA2-0418-000	Mount, Rod	8-4	3
RA2-0420-000	Lever, Door Sensing, B	8-4	7
RA2-0448-000	Pivot	8-2	1
RB1-1273-000	Guide, Cassette	8-10	1
RB1-1274-000	Eliminator, Static Charge	8-7	3
RB1-1278-000	Lever, Paper Sensing	8-9	3
RB1-1286-000	Cover, E	8-9	4
RB1-1291-000	Shaft, 2	8-2	2

Table A-2 Numerical Parts List - continued

Part No.	Description	Fig	Ref
RB1-1292-000	Plate, Stop, Clutch, R	8-8	4
RB1-1294-000	Rod, Left	8-8	5
RB1-1317-000	Plate, Pressure, Right	8-7	4
RB1-1318-000	Plate, Pressure, Left	8-7	5
RB1-1324-000	Lever	8-7	6
RB1-1325-000	Plate	8-9	5
RB1-1336-000	Cover, Cable	8-2	16
RB1-1343-000	Knob, Print Density	8-7	7
RB1-1344-000	Bracket, Anti-static Brush	8-7	8
RB1-1346-000	Plate, HVT	8-10	2
RB1-1349-000	Hook, Right	8-7	9
RB1-1350-000	Hook, Left	8-7	10
RB1-1352-040	Shutter, Laser	8-6	1
RB1-1367-000	Retainer	8-8	6
RB1-1380-020	Bracket, Cable	8-10	3
RB1-1385-000	Rod	8-8	7
RB1-1386-000	Roller, Pickup	8-7	15B
RB1-1399-000	Plate, Continuity, 1	8-4	4
RB1-1400-000	Plate, Continuity, 2	8-4	5
RB1-1411-000	Roller, Pickup	8-5	20
RB1-1421-000	Cover	8-2	4
RB1-1422-000	Shaft, Gear, A	8-4	8
RB1-1423-000	Shaft, Gear, B	8-4	9
RB1-1424-000	Shaft, Gear, C	8-4	10
RB1-1429-000	Guide, Connector	8-4	11
RB1-1438-000	Lever, Sensor, A	8-4	6
RB1-2748-000	Stopper, Registration	8-8	8
RB1-5442-000	Plate, Stop, Clutch	8-8	10
RB1-5445-000	Plate, Mounting, Right	8-8	11
RB1-5446-000	Plate, Rear Shield	8-10	4

Table A-2 Numerical Parts List - continued

Part No.	Description	Fig	Ref
RB1-5454-000	Spring, Leaf	8-7	11
RB1-5457-000	Cover, Louver	8-6	2
RB1-5459-000	Pad, Shutter	8-6	3
RB1-5460-000	Cover, Center	8-6	4
RB1-5467-000	Eliminator, Static Charge	8-2	20
RB1-5489-000	Screw, Stepped, M3X4	8-5	103
RB1-5490-000	Plate, Mounting, Left	8-8	12
RB1-5552-000	Screw, Stepped, M3	8-2	104
RB1-5557-000	Rail, Slide, Right	8-11	4
RB1-5558-000	Rail, Slide, Left	8-11	5
RB1-5559-000	Clamp, Cable	8-10	13
RB1-5562-000	Panel, Rear	8-2	5
RB1-5563-000	Panel, Left	8-2	6
RB1-5575-000	Cover, Rear Cassette	8-3	3
RB1-5786-000	MIO Guide Plate	8-10	15
RB1-5789-000	MIO Guide Rail	8-10	16
RF5-0302-000	Pad, Separation	8-7	12
RF5-0326-000	Plate, Contact Transfer	8-9	7
RF5-0331-000	Plate, Rod, Left	8-8	13
RF5-0395-000	Guide, Paper	8-7	13
RF5-0396-000	Guide	8-7	14
RF5-0397-000	Lever, Sensor, Front, REG	8-9	8
RF5-0400-000	Lever, Sensor, Delivery	8-4	12
RF5-1141-000	Guide, Plate, Protection	8-2	8
RF5-1142-000	Guide, Cartridge	8-8	14
RF5-1150-000	Guide, Entrance	8-4	28
RF5-1165-000	Cover, Front	8-4	13
RF5-1166-000	Panel, Right	8-2	9
RF5-1173-000	Slider	8-2	15
RF5-1176-000	Plate, Cover	8-3	7

Table A-2 Numerical Parts List - continued

Part No.	Description	Fig	Ref
RG5-0194-000	Registration Roller Assembly, Metal	8-8	15
RG5-0195-000	Registration Roller Assembly, Rubber	8-8	16
RG5-0198-000	Face Down Delivery Assembly	8-6	6
RG5-0200-000	FD Roller Assembly	8-6	7
RG5-0209-000	Paper Guide Plate Assembly	8-4	14
RG5-0231-000	Front Cover Connect PCA Assembly	8-4	15
RG5-0239-000	DC Cable Assembly	8-8	17
RG5-0505-000	Delivery Drive Assembly	8-4	16
RG5-1383-000	Laser/Scanner Assembly	8-9	9
RG5-1391-000	Pickup Roller Assembly	8-7	15
RG5-1396-000	Gear Mounting Assembly	8-6	11
RG5-1398-000	Main Drive Assembly	8-8	23
RG5-1399-000	Drum Drive Assembly	8-7	16
RG5-1404-000	Paper Guide Plate Assembly	8-5	17
RG5-1410-000	Transfer Roller Holder Assembly	8-4	20
RG5-1416-000	Cass Size Sensor Assembly	8-10	5
RG5-1417-000	AC Terminal PCA Assembly	8-4	21
RG5-1435-000	HV Power Supply Assembly	8-9	13
RG5-1442-000	Cable, Beam Detect	8-9	10
RG5-1446-000	Option Cable Assembly	8-3	11B
RG5-1447-000	Clutch Cable	8-8	18
RG5-1484-000	Small Interface PCA	8-11	7
RG5-1485-000	Display Panel Cable Assembly	8-2	14
RG5-1539-000	Display Panel Assembly 100/115V	8-2	13
RG5-1540-000	Display Panel Assembly 220/240V	8-2	13
RG5-1541-000	Upper Cover Assembly	8-2	19
RG5-1545-000	Guide, Delivery Unit	8-6	5
RG5-1550-000	Right Foot Assembly	8-3	10
RG5-1551-000	Left Foot Assembly	8-3	11
RG5-1552-000	Front Door Assembly	8-5	19

Table A-2 Numerical Parts List - continued

Part No.	Description	Fig	Ref
RG5-1557-000	Fusing Assembly 100/115V	8-4	18
RG5-1558-000	Fusing Assembly 220/240V	8-4	18
RG5-1559-000	DC Controller PCA Assembly	8-10	12
RG5-1560-000	Card Cage Assembly	8-10	11
RG5-1562-000	Multi-purpose Tray Assembly 100/115V	8-2	12
RG5-1563-000	Multi-purpose Tray Assembly 220/240V	8-2	12
RH3-2150-000	Power Supply Assembly 100/115V	8-9	11
RH3-2151-000	Power Supply Assembly 220/240V	8-9	11
RH7-1126-000	Fan (FM1)	8-8	19
RH7-1199-000	Motor, DC 17.5W	8-9	12
RH7-1214-000	Fan (FM2)	8-10	6
RH7-1218-000	Fan (FM3)	8-11	6
RH7-5094-000	Clutch, Electromagnetic	8-8	20
RH7-5095-000	Clutch, Electromagnetic	8-7	15D
RS1-2342-000	Spring, Tension	8-5	17P
RS5-0186-000	Gear, 34T	8-4	22
RS5-0187-000	Gear, 21T/40T	8-4	23
RS5-0576-000	Gear, 25T/33T	8-4	24
RS5-1004-000	Bushing	8-6	10
RS5-1058-000	Bushing	8-8	21
RS5-1147-000	Bushing	8-8	22
RS5-2117-000	Spring, Tension	8-7	17
RS5-2118-000	Spring, Tension	8-5	17Q
RS5-2122-000	Spring, Tension	8-5	17R
RS5-2123-000	Spring, Compression	8-7	18
RS5-2125-000	Spring, Tension	8-4	25
RS5-2126-000	Spring, Tension	8-5	17S
RS5-2128-000	Spring, Tension	8-4	26
RS5-2129-000	Spring, Tension	8-5	17T
RS5-8128-000	Label, Caution, High Temp	8-4	27

Table A-2 Numerical Parts List - continued

Part No.	Description	Fig	Ref
WD1-0224-000	Fuse, 125V, 6.3A	8-9	F101
WD1-0643-151	Fuse, 250V, 3.15A	8-9	F101
WT2-0317-000	Clip, Cable	8-10	7
WT2-0388-000	Clip, Cable	8-8	24
WT2-5011-000	Clip, Cable	8-10	8
WT2-5018-000	Clip, Cable	8-2	18
WT2-5018-000	Clip, Cable	8-10	9
WT2-5114-000	Bushing	8-10	10
WT2-9501-000	Holder, Cable	8-10	17
XA9-0253-000	Screw, w/washer, M3X8	8-4	105
XA9-0253-000	Screw, w/washer, M3X8	8-5	105
XA9-0267-000	Screw, TP, M3X6	8-2	106
XA9-0267-000	Screw, TP, M3X6	8-4	106
XA9-0267-000	Screw, TP, M3X6	8-7	106
XA9-0267-000	Screw, TP, M3X6	8-8	106
XA9-0267-000	Screw, TP, M3X6	8-9	106
XA9-0267-000	Screw, TP, M3X6	8-10	106
XA9-0267-000	Screw, TP, M3X6	8-11	106
XA9-0375-000	Screw, M3X25	8-9	107
XB1-2300-607	Screw, BH3X6(S)	8-6	108
XB1-2300-607	Screw, BH3X6(S)	8-7	108
XB1-2301-407	Screw, Machine, Trus Head M3X14	8-11	122
XB1-2302-507	Screw, Machine, Trus Head M3X25	8-10	109
XB1-2400-809	Screw, Machine M4X8	8-3	110
XB1-2400-809	Screw, Machine M4X8	8-9	110
XB1-2400-809	Screw, Machine M4X8	8-10	110
XB4-7400-809	Screw, Tap Binding Head M4X8	8-5	111
XB4-7400-809	Screw, Tap Binding Head M4X8	8-7	111
XB4-7400-809	Screw, Tap Binding Head M4X8	8-8	111
XB4-7400-809	Screw, Tap Binding Head M4X8	8-9	111

Table A-2 Numerical Parts List - continued

Part No.	Description	Fig	Ref
XB4-7400-809	Screw, Tap Binding Head M4X8	8-10	111
XB4-7400-809	Screw, Tapping, Trus Head	8-2	CH111
XB4-7401-007	Screw, Pan Head Self-tap	8-6	112
XB4-7401-009	Screw, Bind Head Self-tap	8-4	113
XB6-7300-809	Screw, Machine M3X8	8-4	114
XB6-7300-809	Screw, Machine M3X8	8-7	114
XB6-7300-809	Screw, Machine M3X8	8-8	114
XB6-7301-609	Screw, TP, M3X16	8-4	115
XD2-1100-242	Retaining Ring (e-type)	8-4	116
XD2-1100-322	Retaining Ring (e-type)	8-7	117
XD2-1100-402	Retaining Ring (e-type)	8-8	118
XD2-1100-502	Retaining Ring (e-type)	8-7	119
XD2-1100-502	Retaining Ring (e-type)	8-8	119
XD2-1100-642	Retaining Ring (e-type)	8-6	120
XD2-1100-642	Retaining Ring (e-type)	8-7	120
XD2-1100-642	Retaining Ring (e-type)	8-8	120
XD9-0079-000	Washer, Wave	8-4	30
XG9-0260-000	Retaining Ring (e-type)	8-5	121

B

I/O Information

Bi-Tronics Parallel Cable Information

The Bi-Tronics parallel interface is compatible with Centronics parallel interfaces. To take advantage of its enhanced capabilities such as bi-directional communication between the computer and printer, faster transmission of data, and auto configuration of printer drivers the customer must have:

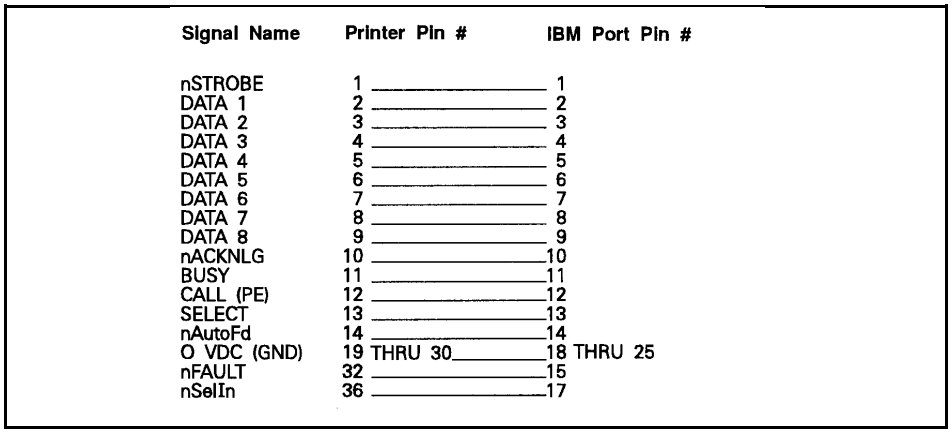
- Support in software applications for these features.
- A parallel cable with the correct pin configuration (see below).

Parallel Cable Pin Configuration

For best results, use the C24542D, C2950A, C2951A cable, or equivalent. Most existing parallel cables support Bi-Tronics communication, but some might have incompatible pin assignments.

CAUTION Ensure that all power and interface cables on the printer and host computer are properly grounded in compliance with local codes.

Figure B-1



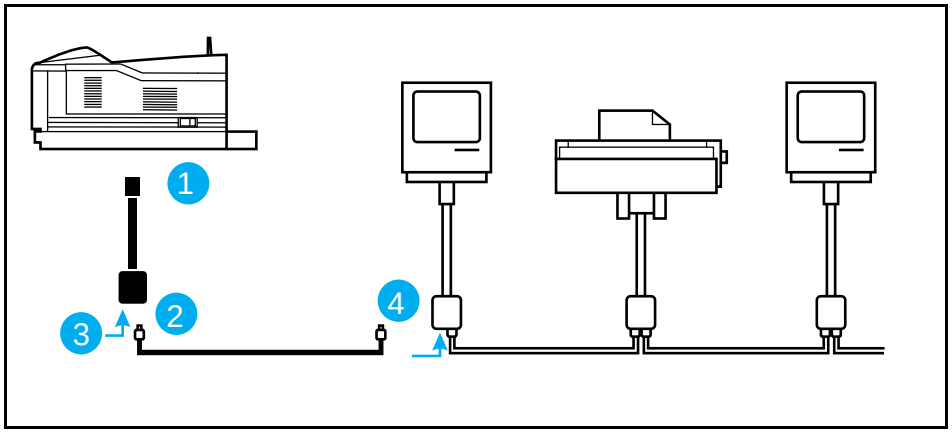
Parallel Cable Pin Assignments (C24542D)

Connecting to LocalTalk Networks

The printer does not come with a LocalTalk network cable. Use a standard LocalTalk network cable and connector kit, such as the HP LocalTalk Network Cable Kit, part number 92215N. You will need one connector kit for each printer on the network, and another for each Macintosh computer on the network.

Connecting to the END of a LocalTalk Network

Figure B-2

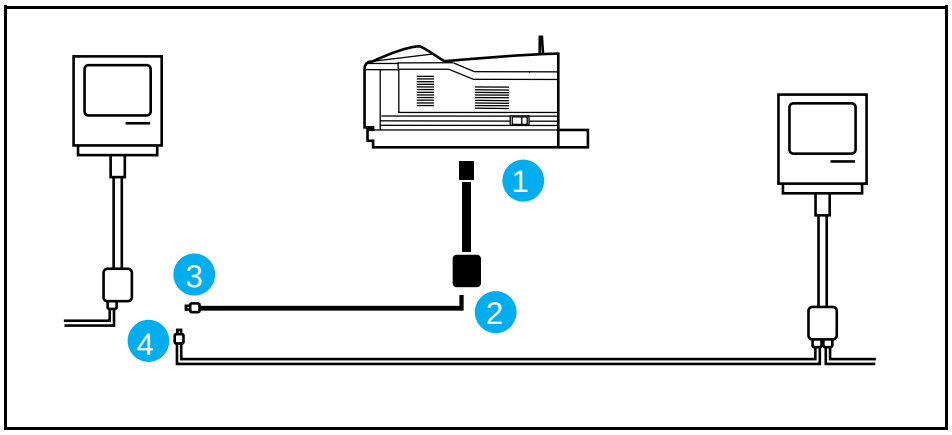


Connecting to the END of a LocalTalk Network

1. Disconnect the printer from its power source. Insert the connector box cable into the LocalTalk port of the printer.
2. Insert one end of the cable into the new connector box.
3. If the connector box is not self-terminating, insert a terminating resistor into the connector box.
4. Insert the other end of the cable into the last connector box on the network. (Remove the terminating resistor if necessary.)
5. Reconnect the printer to its power source.

Connecting to the MIDDLE of a LocalTalk Network

Figure B-3



Connecting to the MIDDLE of a LocalTalk Network (1 of 2)

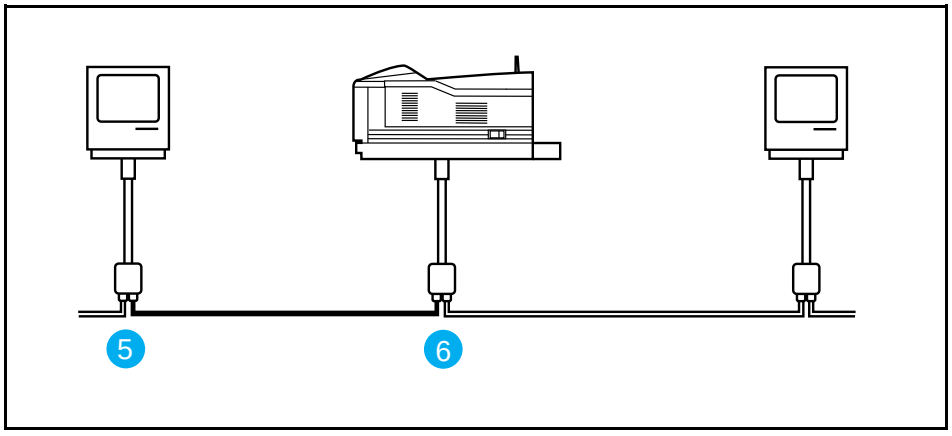
1 Disconnect the printer from its power source. Insert the new connector box cable into the LocalTalk port of the printer.

2 Insert one end of the new cable into the connector box.

3 Place the other end of the new cable next to a connector box on the network.

4 Unplug one cable from the connector box on the network.

Figure B-4



Connecting to the MIDDLE of a LocalTalk Network (2 of 2)

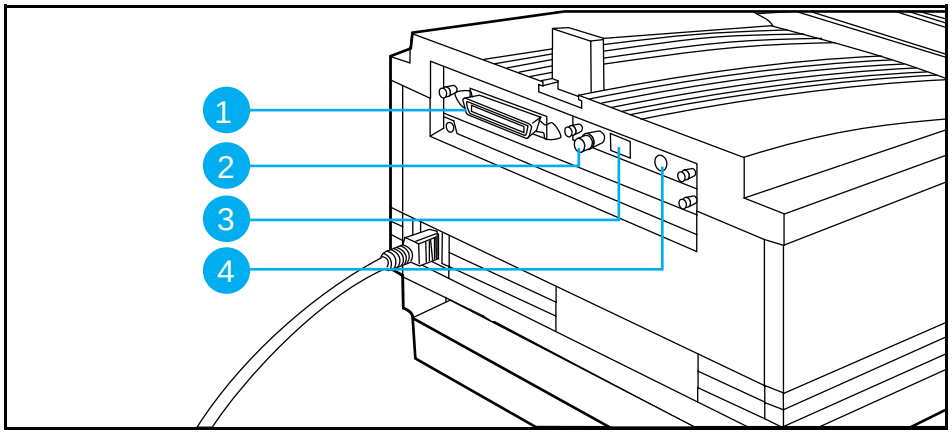
5 Insert the new cable into the connector box on the network.

6 Insert the cable you removed from the network into the new connector box. Then, reconnect the printer to its power source.

Connecting to a Network.

The printer supports up to four different cables: Bi-Tronics parallel, (Figure B-5, callout 1), BNC (ThinLAN) (Figure B-5, callout 2), 10Base-T (RJ-45) (Figure B-5, callout 3), and DIN-8 (LocalTalk) (Figure B-5, callout 4). Select the appropriate interface cable from those shown below for the system and connect the cable or cables to the printer.

Figure B-5



I/O Connector Locations

The cable used to connect the printer to the network, a BNC “T” connector, and a 50 Ohm terminator are not provided with the printer. They must be purchased separately.

NOTE You may attach either a ThinLAN cable or a 10Base-T cable, but not both at the same time.

BNC Interface

Attach one section of the ThinLAN cable to one side of the BNC “T” connector. Attach another ThinLAN cable section or a 50 Ohm terminator to the other side. If you are attaching the printer to the end of your network you must connect a 50 Ohm terminator.

10Base-T Interface

Plug the connector of the twisted-pair network cable into the 10Base-T jack (RJ-45) on the HP JetDirect card. The other end of the cable should then be attached to a twisted-pair hub/concentrator.

DIN-8 (LocalTalk) Interface

Plug the end of the DIN-8 cable into the LocalTalk port on the HP JetDirect card.

NOTE

If you are using only the LocalTalk port, `18 MIO NOT READY` will appear every time you turn on the printer. This message will automatically disappear after 5 minutes.

Optional Network Configuration.

The following is for HP LaserJet 4MV printers only.

Certain network parameters for Novell NetWare, UNIX (HP-UX, Solaris, or SunOS), and EtherTalk networks might need to be set depending upon the network configuration. The following describes the parameters and procedures to set those parameters.

By factory default, all supported network protocols are enabled in the HP LaserJet 4MV printer.

Disabling unused protocols will:

- Rid the network of unwanted broadcast messages from the printer.
- Provide better control over who prints to the printer.
- Provide only pertinent information on the self test page.
- Allow the display of warning messages on the printer control panel display to show protocol-specific error conditions. The procedures for disabling the network protocols is found later in this appendix.

Software which allows configuration on the supported networks is included with the printer, except for UNIX (AIX, HP-UX, Solaris, or SunOS) which must be purchased separately.

Network software configuration information for the printer is located in the HP JetDirect Network *Interface Configuration Guide* included with the HP LaserJet 4MV printer.

To Enter the MIO Menu:

1. Press **On Line** to take the printer offline.
2. Press **Menu** until `MIO MENU` appears.
3. Press **Item** until `CFG NETWORK=NO *` appears.
4. Press **+** until `CFG NETWORK=YES` appears.
5. Press **Enter**. `CFG NETWORK=YES *` appears.

Configuring Novell NetWare Frame Type Parameters.

Normally selecting a NetWare frame type is not required. The HP JetDirect card automatically selects a NetWare frame type, and only when this selection is incorrect do you have to set the NetWare frame type through the HP LaserJet 4MV control panel. The NetWare frame type is displayed on the self test page.

To manually configure Novell NetWare parameters:

1. Press **Item** until `CFG NOVELL=NO *` appears.
2. Press **+** until `CFG NOVELL=YES *` appears.
3. Press **Enter**. `CFG NOVELL=YES` * appears.
4. Press **Item**. `FRAME=AUTO *` appears.
5. To configure the Novell NetWare protocol, Press **+** to select one of these frame types:

Table B-1 Novell NetWare Frame Types on an HP JetDirect Ethernet Card

Frame Type	Description
AUTO (default)	All listed Novell frame types will be allowed.
EN_8023	Limit frame types to IPX over IEEE 802.3 frames. All others will be counted and discarded.
EN_II	Limit frame types to IPX over Ethernet II frames. All others will be counted and discarded.
EN_8022	Limit frame types to IPX over IEEE 802.2 frames. All others will be counted and discarded.
EN_SNAP	Limit frame types to IPX over SNAP with Ethernet frames. All others will be counted and discarded.

6. Press **Enter** to save the selection. An asterisk * appears.
7. If other protocols will be used, continue with the next section. Otherwise, skip to “Disable Network Protocols” at the end of this appendix.

Configuring TCP/IP Parameters

The HP JetAdmin utility for UNIX (sold separately) may be used to configure TCP/IP parameters. If you do not have the HP JetAdmin utility for UNIX, or you are using a UNIX system other than HP-UX, Solaris, or SunOS, you may use the control panel of the printer to configure these TCP/IP parameters manually:

- Usage of the bootp file for configuration parameters (the default is to use the bootp file) IP address (4 bytes)
- Subnet mask (4 bytes)
- Syslog server IP address (4 bytes)
- Default gateway (4 bytes)
  TCP connection timeout (in seconds)

To manually configure TCP/IP parameters:

1. Press **Item**. `CFG TCP/IP=NO *` appears.
2. Press **+**. `CFG TCP/IP=YES` appears.
3. Press **Enter**. `CFG TCP/IP=YES *` appears.
4. Press **Item** to manually configure TCP.IP parameters. `BOOTP=YES *` appears. If you keep `BOOTP=YES *`, then the values for the TCP/IP parameters will be provided by the bootp file, no other TCP/IP configuring is necessary.
5. Press **+** to change the value of the BOOTP=parameter. `BOOTP = NO` appears.
6. Press **Enter** to save the selection. `BOOTP=NO *` appears. If you selected `BOOTP=NO *`, then you will be prompted to configure each of the TCP/IP parameters.
7. Press **Item** to continue configuring.*** `IP BYTE 1 = ALUE *` *** appears.
8. Press **+** until the value of the first byte of the IP address appears on the control panel display. Note that if you Press and hold **+**, the value will scroll rapidly.
9. Press **Enter** to save the value.
10. Press **Item** to continue. Repeat steps 8 and 9 to configure the remaining bytes of the IP address.
11. Repeat steps 8 through 10 to configure the subnet mask bytes (SM), syslog server IP address (LG), default gateway (GW), and timeout (TIMEOUT).
12. If no other protocol is enabled, Press **On Line**. After completing this guide refer to the HP JetDirect Network Interface Configuration Guide for configuration instructions.

Configuring Apple EtherTalk Phase Parameter

To configure EtherTalk parameters:

1. If you do not want to configure the phase parameter, Press **On Line**.
2. Press **Item**. `CFG ETALK=NO *` appears.
3. Press **+**. `CFG ETALK=YES` appears.
4. Press **Enter**. `CFG ETALK=YES *` appears.
5. Press **Item**. `Phase=2 *` appears.
6. Press **+** to change the phase parameter. `Phase=1` appears.
7. Press **Enter** to save the new value. `Phase=1 *` appears.
8. Press **On Line**. You may want to configure the AppleTalk name and assign a preferred EtherTalk Zone.
9. After completing this guide refer to the HP JetDirect Interface Configuration Guide for further configuration instructions on using the HP LaserJet Utility.

Disable Network Protocols (Optional).

1 Press **On Line** to take the printer offline.
2 Press **Menu** repeatedly until MIO MENU appears.
3 Press **Item**. CFG NETWORK=NO * appears.
4 Press **+**. CFG NETWORK=YES * appears.
5 Press **Enter**. CFG NETWORK YES * appears.
6 Press **Item** to scroll through each network protocol. NOVELL=ON * appears.

To Disable Novell NetWare:

1 Press **+** to change to NOVELL=OFF.
2 Press **Enter** to save the new status. NOVELL=OFF * appears.
3 Press **Item** to continue configuring. DLC/LLC=ON * appears.

To Disable DLC/LLC:

1 Press **+** to change to DLC/LLC.
2 Press **Enter** to save the new status. DLC/LLC * appears.
3 Press **Item** to continue configuring. TCP/IP=ON * appears.

To Disable TCP/IP:

1 Press **+** to change to TCP/IP=OFF.
2 Press **Enter** to save the new status. TCP/IP=OFF * appears.
3 Press **Item** to continue configuring. ATALK=ON * appears.

To Disable Apple EtherTalk and LocalTalk:

1 Press **+** to change to ATALK=OFF.
2 Press **Enter** to save the new status. ATALK=OFF * appears.
3 Press **Item** to continue configuring.

C

Regulatory Information

Laser Safety (U.S.A.)

The Center for Devices and Radiological Health (CDRH) of the U.S. Food and Drug Administration implemented regulations for laser products manufactured since August 1, 1976. Compliance is mandatory for products marketed in the United States.

This printer is certified as a "Class 1" laser product under the U.S. Department of Health and Human Services (DHHS) Radiation Performance Standard according to the Radiation Control for Health and Safety Act of 1968. Since radiation emitted inside this printer is completely confined within protective housings and external covers, the laser beam cannot escape during any phase of normal user operation.

WARNING! Never operate or service the printer with the protective cover removed from the Laser/Scanner Assembly. The reflected beam, although invisible, can damage your eyes.

Laser Statement (Finland)

The following applies to printer operation and servicing in Finland.

LASERTURVALLISUUS

LUOKAN 1 LASERLAITE
KLASS 1 LASER APPARAT

HP LaserJet(s) 4V and 4MV laserkirjoitin on käyttäjän kannalta turvallinen luokan 1 laserlaite. Normaalissa käyt"ssä kirjoittimen suojakotelointi estää lasersäteen pääsyn laitteen ulkopuolelle.

Kirjoittimen on hyväksynyt Suomessa laserturvallisuuden osalta Sähk"tarkastuskeskus. Laitteen turvallisuusluokka on määritetty valtioneuvoston päät"ksen N:o 472/1985 ja standardin EN 60825 (1991) mukaisesti.

VAROITUS ! Laitteen käyttäminen muulla kuin käytt"ohjeessa mainitulla tavalla saattaa altistaa käyttäjän turvallisuusluokan 1 ylittävälle näkymätt"mälle lasersäteilylle.

VARNING ! Om apparaten används på annat sätt än i bruksanvisning specificerats, kan användaren utsättas f"r osynlig laserstrålning, som “verskrider gränsen f”r laserklass 1.

HUOLTO HP LaserJet(s) 4M and 4MV kirjoittimen sisällä ei ole käyttäjän huollettavissa olevia kohteita. Laitteen saa avata ja huoltaa ainoastaan sen huoltamiseen koulutettu henkil". Tällaiseksi huoltotoimenpiteeksi ei katsota väriainekasetin vaihtamista, paperiradan puhdistusta tai muita käyttäjän käsikirjassa lueteltuja, käyttäjän tehtäväksi tarkoitettuja ylläpitotoimia, jotka voidaan suorittaa ilman erikoisty"kaluja.

VARO ! Mikäli kirjoittimen suojakotelo avataan, olet alttiina näkymätt"mälle lasersäteilylle laitteen ollessa toiminnassa. Älä katso säteeseen.

VARNING ! Om laserprinterns skyddsh"lje “ppnas då apparaten är i funktion, utsättas användaren f”r osynlig laserstrålning. Betrakta ej strålen.

Tiedot laitteessa käytettävän laserdiodin säteilyominaisuuksista:

Aallonpituus 777,795 nm
Teho 5 mW
Luokan 3B laser

Toner Safety

NOTE In case of toner spills, skin and clothing are best cleaned by removing as much toner as possible with a dry tissue, then washing with cold water. Hot water causes toner to permanently set into clothing.

MSDS Information

A Material Safety Data Sheet (MSDS) for toner or any other chemical used in the printer is available through Hewlett-Packard's Customer Information Center by either mail or fax.

By mail:

To obtain an MSDS for the HP C3900A toner cartridges through the mail, call the Customer Information Center (CIC) at 1-800-752-0900 between 6 A.M. and 5 P.M. Pacific Standard Time.

By fax:

To obtain an MSDS for the HP C3900A toner cartridges by fax, call HP ASAP (Automated Support Access Program) at 1-800-333-1917 and follow the instructions for using the HP FIRST fax service.

NOTE See "Technical Assistance" earlier in this chapter for more information on the HP FIRST service.

Ozone Emission

These printers do not use high voltage corona wires in the electrophotographic process, and therefore generate no measurable ozone gas (O_3). The printers instead use charging rollers in the toner cartridge and in the print engine.

FCC Statement (Class B)

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help. Any changes or modifications not expressly approved by Hewlett-Packard could void the user's authority to operate this equipment.

NOTE

Use of a shielded interface cable is required to comply within the Class B limits in Part 15 of FCC rules.

VCCI Statement (Japan)

The VCCI statement below is required in Japan. It is similar to the FCC regulatory statement.

Figure C-1

この装置は，第二種情報装置（住宅地域又はその隣接した地域において使用されるべき情報装置）で住宅地域での電波障害防止を目的とした情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）基準に適合しております。

しかし，本装置をラジオ，テレビジョン受信機に近接してご使用になると，受信障害の原因となることがあります。

取扱説明書に従って正しい取り扱いをして下さい。

VCCI Statement (Japan)

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